# What's in This Issue

We introduce "Bill Smith" who works on a machine and profits by its output

"Bill Smith" is the hero of *American Machinist's* public relations presentation. "Bill" is a typical American workman, enjoying his trade, his home, his recreations and the opportunities that employment in the machine age have made possible for him. Read about **the job industry has to do in selling itself** to its employees, as personified by Bill, and to the public (page 830e).

A. Goodwin, of the Murray Corporation of America, tells **what his company is doing to train boys** to take their place in industry. Featured in the program is a close tie-in between shop work and day and night classroom work. The article (page 836) gets down to cases and details of the course.

Westinghouse hit upon the plan of planting a **"capsule" to preserve a record of today's civilization** for 5,000 years. Archeologists of 6938 A.D. will thus have something better to go by than fossilized remains and scratches on the rocks. How the capsule was made and what it is made of is described on page 841.

Shop operations on tractor parts, as practiced by Minneapolis-Moline, are given on page 831. **Tools are designed with an eye to model changes** in order to obtain a blend of efficiency and flexibility.

When the right cam is not available for a screw machine job, **another cam can often be used** by proper selection of change gears. R. M. Bennett, of Underwood Elliot Fisher, tells how to apply this principle and gives a specific example (page 835).

C. W. Hinman, continues his press work series with another installment on automatic feeds. The devices described beginning on page 838, **apply especially to high-speed work.**

Tapered grinding was made straight by a simple device that **took the spring out of the wheel spindle.** This is only one of the many "Ideas From Practical Men" which begin on page 866.

Our Time Data Sheets this time give two more pages on spray painting. These are a continuation of Parts I and II (*AM*—Vol. 82, page 811) and tell **how the tables of time values can be applied.**

The farmer influences the machinist through his purchases of agricultural implements. Right now things are looking better for the farmer. His income is up and **he is ready to increase his purchases.** See our appraisal of activities in the farm implement field on page 846a.

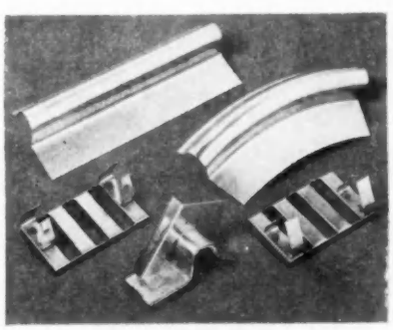
## COMING

Next number is our National Metal Show Number. It will mark the National Metal Congress, opening on October 17. Whether or not you plan to attend the congress and exhibition you will want to know what's going on in Detroit that week.

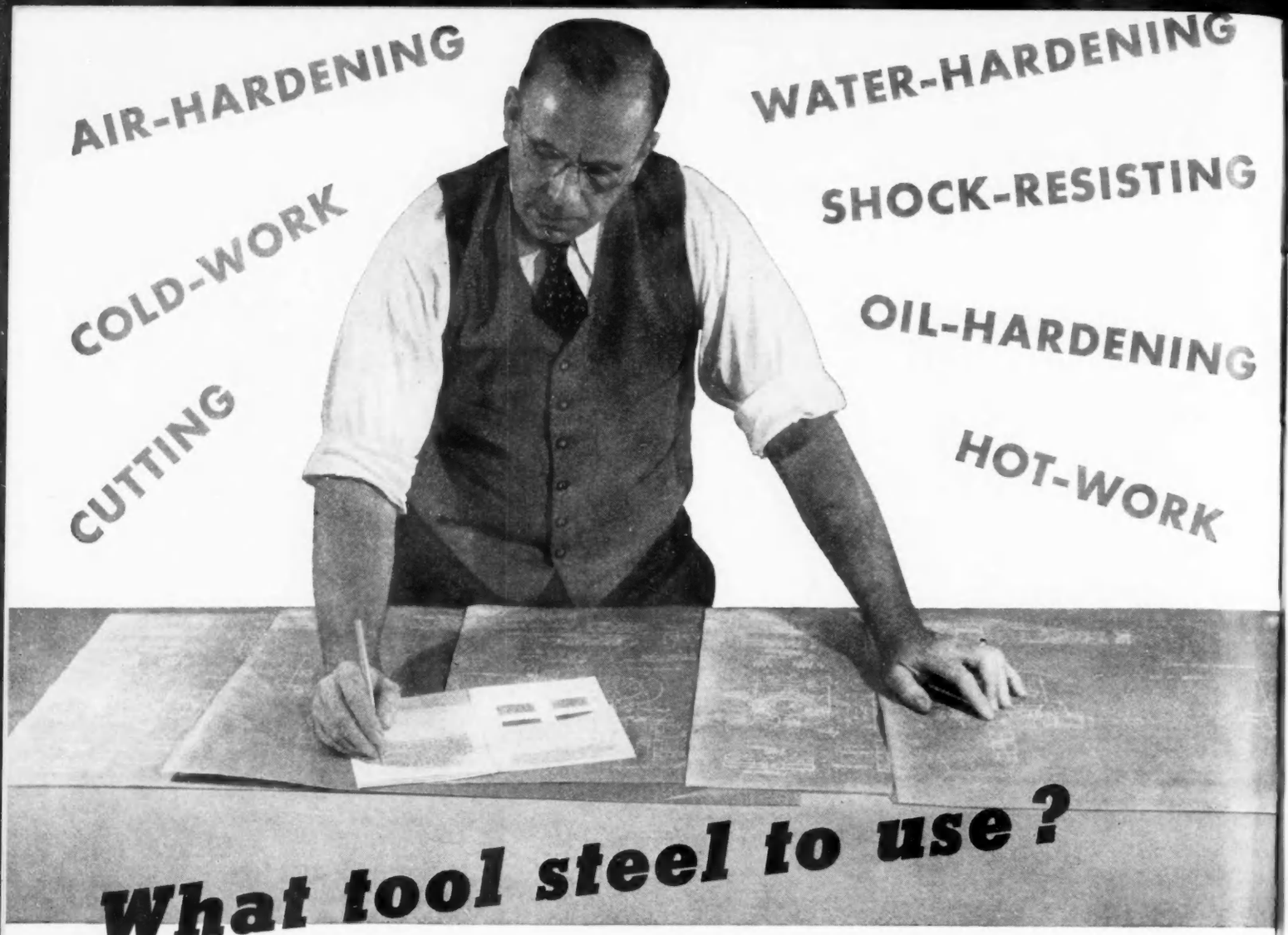
The Metal Show Number will include our annual "Show in Print" section—a preview of the new equipment and materials to be displayed. Also a twelve-page section on "The Working of Stainless Steels"—a practical compilation of basic data on how to machine, weld, heat-treat and otherwise process these novel alloys. You will want to keep this for future reference.

General articles will deal with timely subjects that tie in with the discussions of the American Society for Metals and the American Welding Society. These articles are original, exclusive contributions to *American Machinist*, not preprints or abstracts from the technical papers.

Topics covered will be a concise summary of carburizing practice, an analysis of metal cutting by the use of high-speed moving pictures, modern methods of control in plating operations, the application of welding to machine parts and a new set of Time Data Sheets, applying to handling operations for degreasing, heat-treating and sandblasting.



How to fabricate stainless steels will be covered in a twelve-page special section




# What tool steel to use?

***No brow-wrinkling if you have a Bethlehem Tool Steel Guide***

HERE's a 36-page booklet that gives a clear picture of the entire range of tool steels and their fields of use, plus a systematic method for selecting the right steel for the purpose.

By means of a few direct, easily-answered questions this guide will lead you to the group of perhaps three or four steels that have the general qualifications for your job. Then the data on physical properties, comments on the general nature of the steels and tables indicating types generally used for various purposes, will enable you to accurately select the most suitable grade for your particular purpose.

This booklet will save you much brain-racking in selection of steel and will help you avoid losses in time and material through using the wrong steel.

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AMERICAN MACHINIST

ESTABLISHED 1877

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BURNHAM FINNEY, Editor

# A Good Insurance Policy

INTELLIGENT public relations has recently been described as "an insurance policy against the losses (to industry) arising from popular disfavor and political experimentation." Fortunately, industry finally is waking to the necessity for taking out such an insurance policy.

Realizing the importance of selling to all branches of industry the benefits to be derived from this insurance policy, *American Machinist*, in conjunction with all other McGraw-Hill papers, is inaugurating in this issue an editorial program on public relations. Immediately following this page is a 24-page insert on public relations which is divided into three parts:

Part I is a broad consideration of the problem under the heading "Why Public Relations." Part II contains some comments on public relations, including suggestions that may be helpful to companies in formulating or appraising their own plans. With it is a valuable check list. Part III is the story of what machines mean to the American factory worker in his everyday life. To make it more vivid and personal, it has been written in the form of "What Machines Mean To Bill Smith."

In succeeding issues we shall show what individual companies are doing in public relations both in connection with a broad program and with specific phases of it, such as their relationship with their own communities.

There is no denying the fact that the biggest job confronting industry today is not one of manufacturing or of sales, but one of telling its story to a doubting public. So many falsehoods have been told the people about industry that a prejudice harmful to the public good has arisen. And that is unfortunate, because the payrolls streaming out of manufacturing plants are literally the economic lifeblood of the country. Without them, the country is paralyzed; with them, the people prosper. If the public has a misunderstanding of industry which leads to unnecessary restrictions imposed by law, the result harms not only management, but the eight million factory workers in the United States and the tens of millions dependent on them.

But before industry can set out to tell the public its story, it must be sure that its own house is in order. Its relations with its own employees must be right. Then it must start in its own community before reaching out farther. The job to be done was well stated by James W. Hook, president of the New England Council, in a recent address:

"THE PUBLIC must be told the truth about business, even though it involves divulging information that in the past has been considered sacred property to be withheld from others at all costs. The place to begin is in the individual plant. Data collected by manufacturers' associations and chambers of commerce and thrown together for a mass presentation are not enough. The workers in your plant, and the interested neighbors in your town, need a more intimate picture.

"If you employ labor they want to know what your philosophy of management is, the special problems you have to meet, and within reason what success you have had as a payer of wages and earner of profits. Beyond that they want to know if you have been a good citizen."

We echo Mr. Hook's thoughts and urge every metal-working company to put public relations at the top of its list of things to be done.

# *Gaging Business*

BARRING an upset from a European war, the metal-working industry is marching ahead to much improved conditions this Fall. Reports from various sectors of the industry reveal the trend toward increased sales and production. Machine tool orders continued in August their upward movement from the year's low in May. The index of the National Machine Tool Builders' Association now is at 120.9, a sharp gain over the July figure of 89.6 and the highest point reached since last December. Early estimates indicate September machinery sales will be equal to or better than the August volume.

Steel production is staying around 45%, with a good chance that it may advance to 50% next quarter. Strong support in equipment and steel orders comes from the Federal Government which is pouring millions into its pump-priming and national defense programs. The navy alone soon will have under construction in its own and in private yards over a billion dollars worth of ships. Farm implement makers anticipate a fairly good Fall business with the year's total sale equaling the 1936 volume. Airplane makers are working on a huge backlog of orders. Facing a new season with dealers stripped of cars, the automobile industry expects to build 750,000 cars during the fourth quarter, raising the year's production to 2,325,000 units.

NEW ENGLAND—Shipyards empoyment is expanding. Machine tool plants, too, are increasing their workweek as sales grow. Small motor orders show improvement. Hygrade Sylvania Corp. has added $50,000 in lamp-making machinery at its Salem plant. Stove foundries are operating on a five-day week. Associated Industries of Massachusetts reports August orders in the metal working industry at 69.8, compared with 50.9 in July.

PITTSBURGH—Steel operations continue to expand slowly. Mills are confident that they can maintain a rate of 45-50% during the fourth quarter. Boat and barge building yards are fairly busy with inquiries out for several sternwheel steamers and for a fleet of 40 barges. A rise in sales of mechanical handling equipment is reported.

CLEVELAND — The Cleveland-Lorain steel rate has been boosted to about 50%, and Republic's local mills are at 75%. Auto parts companies are responsible for much of steel's improvement. Equipment sales are up.

CHICAGO—Steel mills are operating fairly well, but output is likely to level off from the present volume unless automotive buying develops soon. The steel market is currently supported by miscellaneous and structural orders plus sales to companies making grain elevators and kindred grain storage and handling equipment. Railroad buying has been inconsequential. The Milwaukee Road is starting construction of 500 flat cars in its own shops.

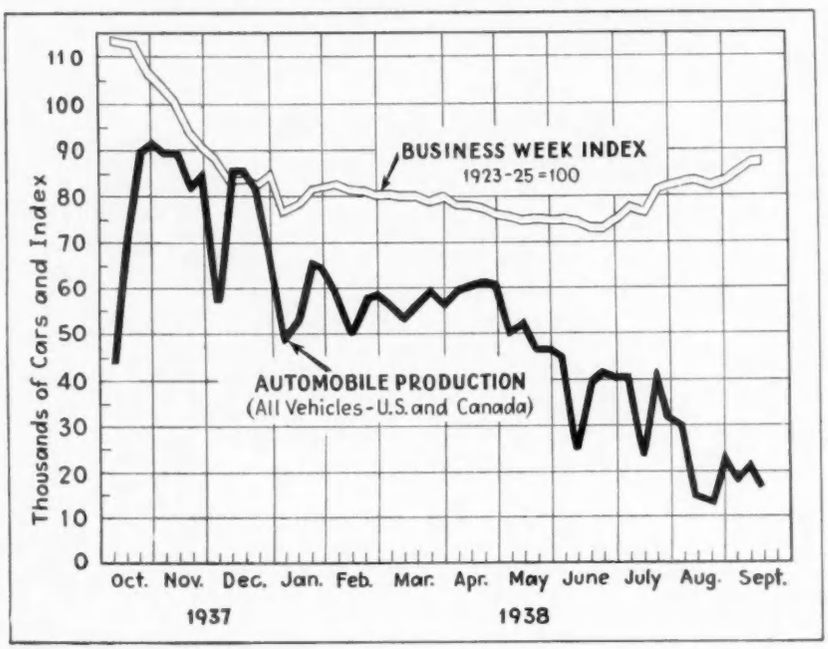
CINCINNATI—Machine tool sales are looking up. Foreign orders, however, overshadow those from domestic sources. Die shops have slackened as automotive business has been completed, but inquiries are in fair volume from the refrigerator, stove and truck industries. Indianapolis reports machinery orders and inquiries the best in several months.

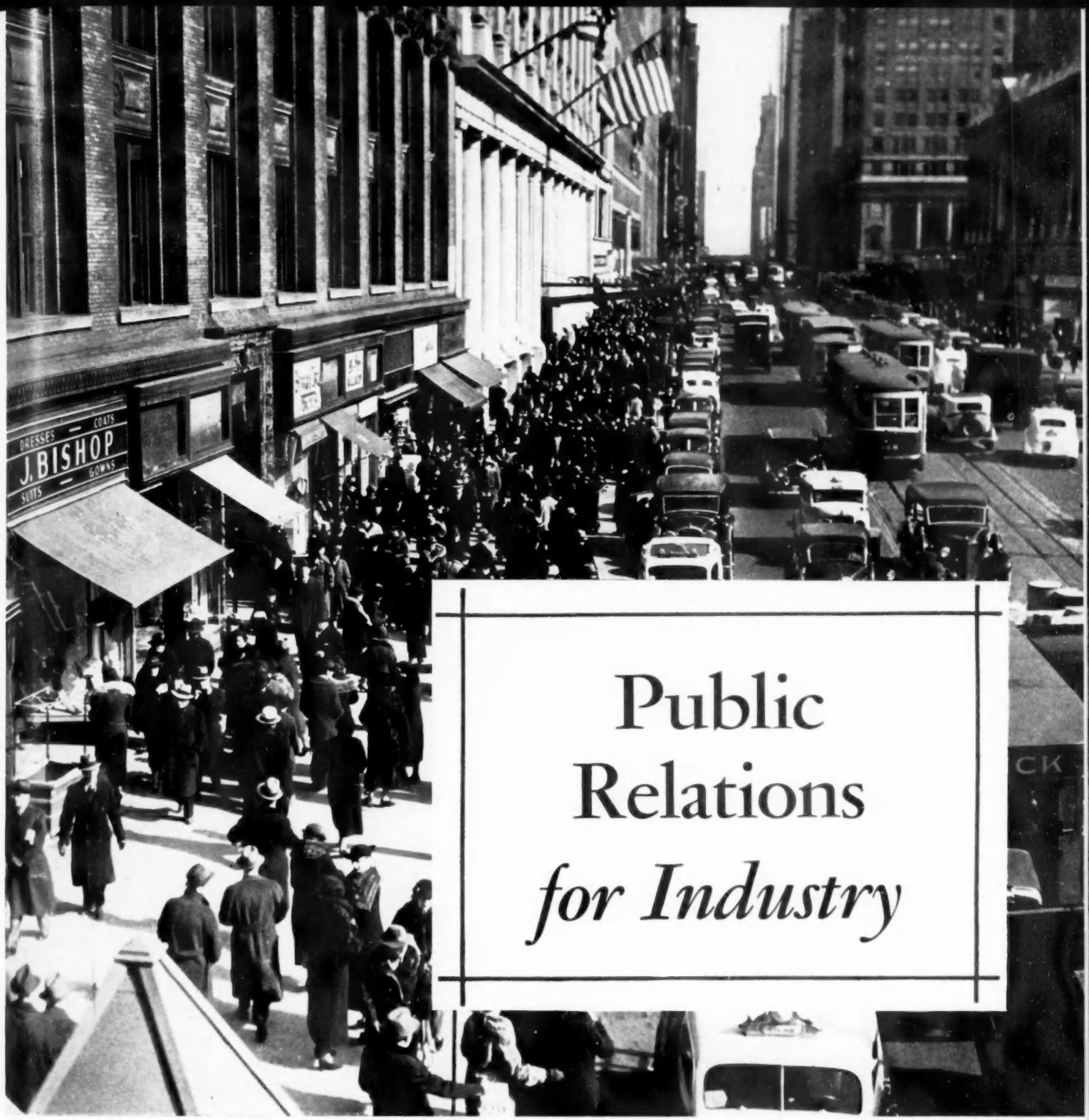
DETROIT—Work in hands of commercial heat-treating companies reflects the scarcity of mechanical changes in 1939 cars. Business has been poor all year, except for a short-lived spurt in July and August. Demand for small tools and supplies is expected to improve as car factories operate on a bigger scale. Machine tool inquiries are better.

SAN FRANCISCO—A backlog of $65,000,000 of aircraft orders in southern California aviation plants, a pick-up in Northwest lumber operations and the hope that Coast-yards may participate in the C-3 shipbuilding program are buoyant factors. Machine tool orders are better, but still are in small volume.

## AUTOMOBILE PRODUCTION VS. GENERAL BUSINESS

**The recently revised Business Week index which uses the years 1923-25 as its base shows a more pronounced upturn in business, despite the temporary decline in cars manufactured per week**






# Public Relations *for Industry*

Why the Good Will of Employees and of the Public is Important— What Can Be Done to Secure It

A McGRAW-HILL PUBLICATION

*Presented by*

AMERICAN MACHINIST

## AN EDITORIAL SERVICE TO MEET

# Industry's Major Problem

To the Readers of

AMERICAN MACHINIST:

THERE IS NO DOUBT that today the American people are taking a keener, more critical interest in the conduct of business than ever before. And when I say critical, I mean exactly that. During recent years most of them have suffered loss, either of jobs or of savings, and under such circumstances men are prone to accept without serious question any scapegoat that appears plausible. In the confusion of fears and resentments, they seem to have concluded that short-sighted and selfish business management is chiefly responsible for their misfortune.

However mistaken and unfair such conclusions may be, management cannot ignore them. It must recognize that in the long run, the opinions of men are the result of experience, of what happens to them each day, much more than of what they are told.

Progressive management has already faced that fact; has already begun to think and work beyond the technicalities of production and distribution that once absorbed most of its energies. It sees more clearly and deals more proficiently with its human responsibilities. It is learning to reconcile the economic success of the industrial unit with the social welfare of worker and community.

Presently, every business—the small retailer as well as the large manufacturer—must learn how to interpret more convincingly to its own public the social as well as the economic benefits of its policies and accomplishments. Only as each business satisfies the newly aroused and critical interest of people in its affairs will it be able to disarm those who trade on the human tendency to blame our troubles on someone else. Yes, if business as a whole is to win a favorable public opinion, each and every business must act to improve its own public relations.

The readers of this journal, and of other business publications, compose, we believe, a group that can achieve for American business a sound and lasting solution of this vital problem. They alone are in position to shape the working conditions of 21 million employees. They alone can mould the attitude of those other millions who compose the various "publics" to which all business must be responsible.

Heretofore, the function of business papers has been to exchange successful experience; to dig up and disseminate practical facts for the use of their readers, serving primarily the technical and merchandising needs of business. But this matter of human relations has now become of equal importance, for good industrial and public relations, it has been found, reduces corporate losses, removes fear and suspicion, promotes operating efficiencies in both production and sales. A better knowledge of public relations technique is, therefore, quite properly essential for men in, or moving into, positions of greater executive responsibility.

So, beginning with this insert, each McGraw-Hill publication sets out to strengthen its editorial service in the important domain of Public Relations. I hope that the million readers of McGraw-Hill's business papers will get much real and practical help toward building better relationships between their own businesses and their employees, their customers, and the communities in which they must carry on.

James H. McGraw, Jr.

# Why a Public Relations Program

IN LESS THAN two generations the United States has changed from an agricultural to an industrial nation. Living standards and efficiencies at once the despair and envy of other countries have been created. Foreign delegations still flock to our shores to study our methods so that they may use them as patterns for their own organizations. Yet here at home today these methods and the systems responsible for them are under increasing attack.

Since every person employed in productive enterprise is a part of American industry, these attacks imperil the livelihood of nearly forty million workers and their dependents. The newest addition to the payroll has as much—if not more—at stake as the veteran business executive. That also is true of particular industries which at present may not be under direct fire. All industry is so interrelated and interdependent that even the seemingly immune enterprise must suffer when the legitimate activities and the buying power of their customers, or the customers of their customers, are curtailed.

Ironically enough, public acquiescence in many of the current attacks is an indirect recognition of the satisfactory manner in which our industrial system normally functions. Reasonable opportunities for the employment of those ambitious to put their mental or physical talents to work, and continually rising standards of living have come to be widely accepted as a matter of course. Any unfavorable change in these conditions leaves the general public surprised, confused and resentful. Such reactions as these make it easy for pressure groups to unloose destructive propaganda which further heightens resentments and breeds new misconceptions.

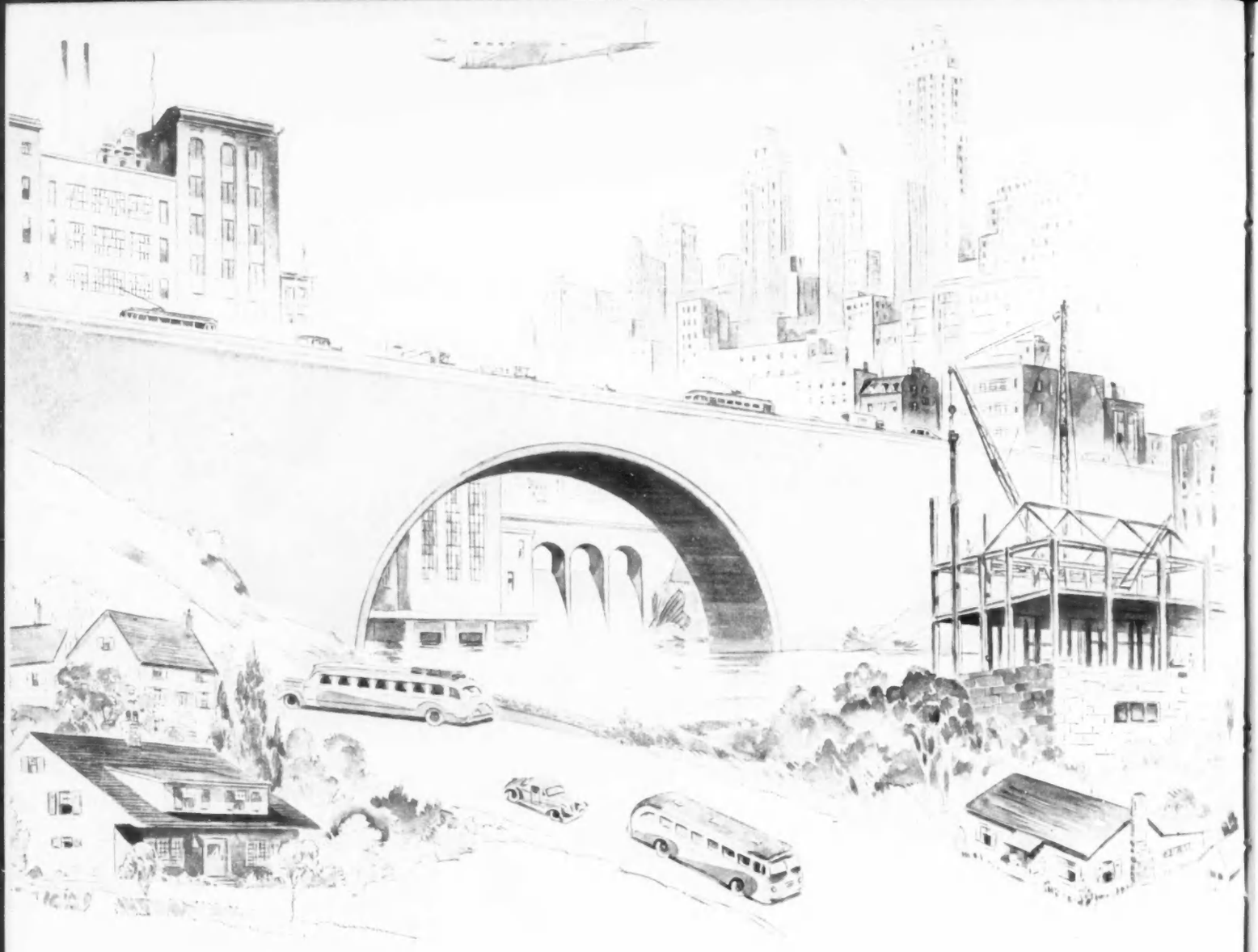
THESE misconceptions take many forms shaped by the experience, the inexperience, or the special interests of the critics. To one it appears that business can't manage itself and must be owned and managed by the government. Another believes that employees are underpaid or that stockholders and executives are overpaid. To others corporate surpluses are too high. Many have convinced themselves that power and machines have reduced employment opportunities; and that industry can raise wages and reduce prices while costs go up.

Several misconceptions are based on faulty generalizations. Because a few companies have been remarkably successful, it is argued that all could make money. Because some corporations have been ruthless, all corporations, it is contended, will stoop to unethical conduct to gain their ends. This is like saying: John Smith killed Bill Brown; John Smith is auburn-thatched; all redheads, therefore, are murderers. Unfortunately, those who would indict all business for the crimes of a few are more subtle in their approach and so create an impression not in accord with the true facts.

To put it bluntly, American industry, once so highly praised for its contributions to the national well-being, is now on the spot. Prevailing misconceptions of how business operates and what it does have made a field day for those who propose to hamstring or destroy private initiative and individual opportunity. These proposals run a broad gamut: They include public ownership, increasing and rigid federal control at the expense of local autonomy, ill-conceived legislation on hours and wages, labor dictatorships, and confiscatory taxes on thrift and employment security.

While the man in the street may be criticized for his willingness to swallow these nostrums, he is not wholly to blame. Industry, too, has been at fault, in assuming either that he was fully informed on those phases of its operations which are properly a matter of public interest, or that a healthy curiosity should be discouraged. Misconceptions multiply where the facts are hidden.

The tragedy of the situation lies in the fact that it might easily have been avoided. In the simple days of local and localized industry, everybody connected with a particular enterprise knew everybody else con-



nected with it, and the details of its operations were an open book. The boss and the employees were neighbors; the customers, for the most part, fellow townsmen. Outside purchases were limited largely to those products which the local community neither manufactured nor raised. Competition in the modern sense was practically non-existent.

As industry developed and enlarged its field of operations, much of this early intimate personal touch was lost. The small enterprise grew bigger. In some cases combinations took in the local business and financial control passed out of the community. The local industry which still retained its identity was busy meeting increased competition and seeking to expand its distribution. Little attention was paid to changing conditions that were fostering misconceptions about the personal relations of the business. Bit by bit the close acquaintance and familiarity of the early days disappeared.

Common understanding of these things also was impeded by the greater variety of occupations as industry expanded. Each man's job became so highly specialized that the old feeling of common partnership in a joint undertaking frequently was buried in an exaggerated feeling of the relative importance of his own work. This made it easy for each occupational group to get the idea that its contribution to the undertaking alone was essential and that many of the other groups were parasitic, or, at best, unimportant.

SUCH mistaken beliefs are the exclusive property of no particular group. "Goods are valueless until sold," chants the sales staff; "without us the wheels of industry would cease to turn." The wheels would turn much faster, growls the production department, "if we didn't have so many lame-brains drawing fat salaries as salesmen." Under the cold glance of both groups, the clerical force heatedly inquires: "How long do you think this business would last if we didn't keep the cost records, send out bills and collect the money for pay checks?" Some executives and engineers, too, have been known to forget that their plans cannot be carried out without the cooperation of other groups.

Possibly the greatest single cause of misunderstanding and friction has been fuzzy thinking on social responsibilities. Many of the responsibilities which rested on the individual or the state in our fathers' and grandfathers' days have been shifted to the shoulders of industry. New ones constantly are added or proposed—often before industry has had time to adjust itself to those which have gone before. Some of these responsibilities affect employee relations; others involve customer relations. The worker, for example, no longer is completely defenseless against the occupational hazards of his employment. "Let the buyer beware" no longer is considered smart merchandising. Many of the changes now embodied in the laws were anticipated by industry itself. Opposition—valid or otherwise—to social legislation, however, has

been used to damn business in the public eye.

Fortunately, the barriers to good will and common understanding can be broken down. The process is a simple one. It consists chiefly in maintaining good policies in human relationships and in keeping all interested people—employees, stockholders and their neighbors, customers and the general public—informed. It means telling them in plain terms what revenue is received and where it comes from, what revenue is paid out and who gets it, how an industry serves the individual, the community and other industries. Finally, it includes the acceptance of the social responsibilities which the advance of civilization imposes upon business.

Add all these things together and you have public relations.

Most employers are willing to accept their social responsibilities, but they are inexpert in making that acceptance articulate. Too many employers have failed to make clear their policies, their practices and their purposes as they relate to fair dealing with employees, investors and the general public. Their intentions have been good, but they have cloaked them with a veil of secrecy and made a mystery out of simplicity. As a result the uninformed have been given a royal opportunity to exercise their imagination. And they have done it!

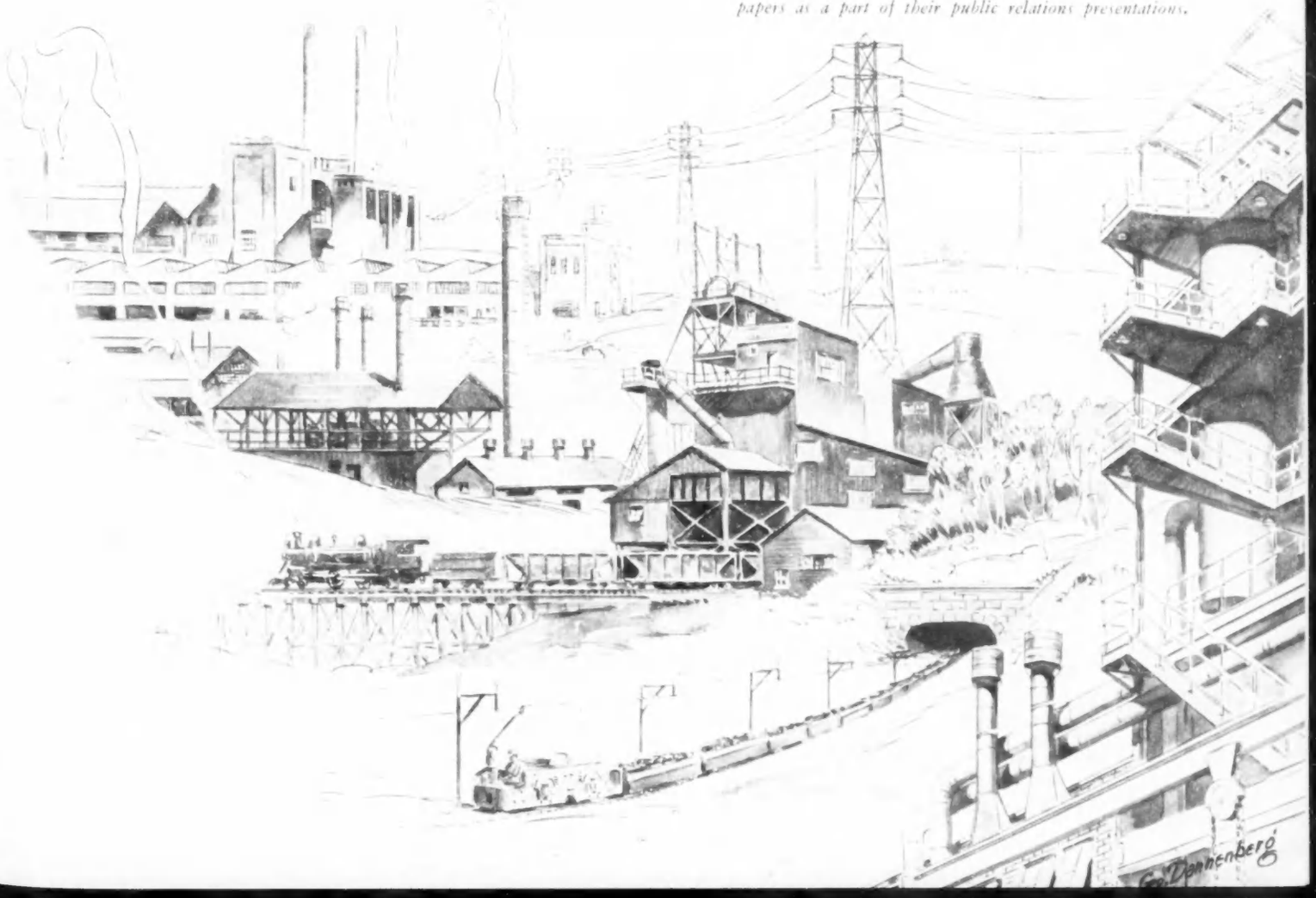
Public relations is a comparatively new activity for most business enterprises and involves a technique which too many have not yet learned. Obviously, the first place for each company to start is within its own organization. This is the "inside job" that builds a company's good name among its own family and lays the firm foundation for building public confidence and favor. As one exponent of the art phrases it: "Industry's public relations cannot be one thing and its private actions and policies something else. The two must be in complete accord."

THE inside job should present no real difficulties to fair-minded employers. Most workers have a normal predisposition to view in a favorable light the organization in which they earn their livelihood. Most companies endeavor to conduct their operations so as to justify that favorable attitude. But too few of them are adept at dramatizing the facts that furnish a substantial basis for maintaining employee good will. So, where misunderstanding and suspicion born of ignorance exist, time may be required to break down the barriers that have grown up.

The task of telling this inside job to the outside world, however, will not be easy, for two reasons. First, it has been so long neglected that the backlog of misunderstanding is large. Second, public relations involves attitudes as well as actions, a viewpoint as well as an organization. Public relations is not a commodity that can be purchased like a car of coal or a bolt of silk; neither can it be sold by "canned" material. Each program to establish sound public relations must be individualized and indisputably stamped with the personality of the company promoting it. *And the deed must always back the word!*

But the task is worth the effort. For, with the inside job right, a properly conceived and intelligently executed public relations program offers business the means of counteracting unjust public suspicion, unfair political attack and unwarranted outside dictation. The need is urgent.

*The above article is being published in all McGraw-Hill papers as a part of their public relations presentations.*



# SOME THOUGHTS ON Public Relations

SOME metal-working companies have good public relations programs which came into existence years ago before anyone had heard of the term. They have been gradually developed through the years. To such companies we would not presume to suggest a new program.

There are many other companies, however, which only recently have realized the importance of public relations. There are still others which don't yet grasp the public relations job ahead. In view of the urgent need for industry to gain the good will of its employees and of the public, we give our readers on this page and the following two pages some thoughts on the conduct of public relations (and by public relations we mean both industrial and public relations, because the two are inseparable).

What we have to say isn't "the last word." Nevertheless, we think that the manager of a metal-working company can well afford to take time to read these suggestions, and to check up to see whether he is doing a good job.

A small company obviously cannot adopt as broad a program as a larger company but it may find some helpful suggestions in these pages. The good will of employees and of the public is a valuable asset, no matter what a company's size.

## INSIDE YOUR PLANT

WHAT goes on inside your plant determines in great measure your relations with the public, especially with the people in your own community. Whether you have ten or a thousand employees each one carries a message about you to his neighbors.

► **SET UP A GOOD INDUSTRIAL RELATIONS PROGRAM.** A committee representing all phases of the company's activities should formulate a program regarding wages, working hours, overtime, promotions, layoffs, vacations, sick benefits, safety, training and education, profit-sharing and collective bargaining. Whenever feasible this program should be submitted to employee representatives for discussion, possible revision and endorsement.

► **APPOINT A LEADER.** There isn't a job in your company more important than that of heading up your industrial relations. Pick an able man with the same care that you would choose a sales manager or a manufacturing manager. Make sure that he is the kind in whom employees would have confidence. He should report directly to the general manager. In the smaller company the job should be handled by the general manager or by his chief assistant.

► **MAKE CLEAR THE AUTHORITY OF DEPARTMENT HEADS.** In larger companies few things create so much trouble as the tendency to divide authority. It encourages the playing of politics. It makes for indecision. Avoid such a situation by clearly defining authority. A simple organization chart will help, but a manual may be necessary. In any event, the functions of all officials should be crystal clear.

► **ACQUAINT EMPLOYEES WITH YOUR PROGRAM.** Don't let any employee be foggy about his relations with the company and about your entire industrial relations program. See that your program is put before your employees either orally or in attractive printed form.

► **SEE THAT YOUR WAGE RATES ARE FAIR TO ALL EMPLOYEES.** Be sure that you are paying prevailing wage and salary scales. Establish uniform rates of pay for equal grades of work throughout the company. Set up pay differentials based on responsibilities involved, skill required, physical effort necessary, mentality and special working conditions for the particular job. Where possible, create financial incentives beyond an average standard. Above all, explain clearly and promptly changes in pay rates.

► **GIVE EMPLOYEES A GOOD PLACE IN WHICH TO WORK.** Safe and sanitary working conditions should be uppermost in your thoughts. See that your plant is well ventilated and heated, that lighting is not only adequate but scientifically distributed, that noise is reduced to a minimum. Make suitable provision for rest periods. Provide adequate facilities to take care of the lunch hour. See that wash- and locker-rooms are provided. If possible and if wanted by employees, set up recreational facilities. They need not be elaborate. Make sure that machinery is guarded and that safety rules are enforced. If there is sufficient demand, operate a caferteria or lunch room so that employees can buy good food at low cost.

► **STABILIZE EMPLOYMENT.** Most employees are chiefly concerned about two things—job security and a reasonably stable annual income. The hourly rate is important, but doesn't mean half so much as an assured

regular pay check with which to support a family. Deep study should be given, therefore, to ways and means of stabilizing production, though sales may fluctuate seasonally. Stabilized production means steady employment. Equally important is the need for providing organized protection against unemployment, sickness, old age and death. A good way to do this is by means of group insurance.

▶ **TRAIN AND EDUCATE EMPLOYEES.** If your resources permit, do not neglect to train apprentices. Even in bad times it is short-sighted to discontinue such training programs. You will wish you hadn't when good times return. See that employees are educated in the company's problems so that they will be ready to advance to better positions.

▶ **RECOGNIZE THE FOREMAN'S IMPORTANCE.** It is trite to say that the foreman is your key man in your relationship with your shop employees, yet that is a truth that cannot be driven home too strongly. Recognize that fact and be sure that he knows your policies thoroughly and is the kind of man who inspires cooperative effort. Spend plenty of time and effort on him.

## OUTSIDE YOUR PLANT

▶ **TELL THE PEOPLE IN YOUR COMMUNITY ABOUT YOUR BUSINESS.** Citizens of your town judge your company by the things they read and are told. Make it your business to see that they are kept accurately and promptly informed of what you are doing. Above everything else, be honest with them.

▶ **BE A GOOD NEIGHBOR IN YOUR TOWN.** Take an active and constructive part in community affairs. Be a good citizen. Encourage employees to take part in civic activities. Cooperate with local charities and character-building agencies.

▶ **SHOW YOUR PLANT TO THE TOWNSPEOPLE.** Invite your employees to bring their families to take a look at the place in which they work. Also invite their friends, neighbors and all the townspeople. That is the best way to offset any talk that working conditions aren't what they should be. When possible larger companies should use motion pictures to show plant operations in schools and before luncheon clubs and should establish regularly conducted plant tours. Such tours build good will. If only five people go on the tour at one time, that makes five more citizens who know about your factory.

▶ **KEEP COMMUNITY LEADERS INFORMED OF YOUR BUSINESS.** See that your town's professional people (teachers, preachers, lawyers, doctors) are familiar with your policies. If you publish an employee magazine, send it to them and to others in your community who might be interested. Whenever the opportunity exists, tell the facts about your business to women's clubs, luncheon clubs and other local organizations. Keep local newspapers aware of what you are doing. In your relations with the press and with the public, don't be unnecessarily secretive about your affairs. If you are located in a small community, local merchants are dependent on the ups and downs of your business and will appreciate word periodically about the outlook.

▶ **COOPERATE WITH OTHER LOCAL COMPANIES.** Join with other local industrialists in telling publicly facts about the importance of industry to your community's life. If such a group exists, take part in a community foreman's club. Support exhibits or expositions of products of local industries.

▶ **COOPERATE WITH YOUR OWN INDUSTRY.** Your industry is represented nationally by its trade association. The association should be a clearing house for plans and experiences of individual companies in industrial and public relations. Contribute your experience and in turn benefit from the experience of others. Don't hold back from active participation. If you do, you hurt not only the industry but eventually yourself.

▶ **MAKE YOUR STOCKHOLDERS YOUR FRIENDS.** Companies whose stock is publicly held should not overlook the opportunity to win the friendship of stockholders. Don't confine your contacts with them to your annual written reports and to notices of meetings. Write them informally now and then about the status of your business, explaining some of your vexing problems and how you are solving them. Invite them to visit your plant and see for themselves the properties in which they have invested and meet the people who are managing them.

▶ **MAKE UNDERSTANDABLE ANNUAL REPORTS.** Instead of making annual reports to stockholders that only a banker can understand, put your report in simple language. An increasing number of companies are doing this, thus helping to take the mystery out of their business. See that your employees get copies of these reports.

▶ **CULTIVATE THE GOOD WILL OF YOUR CUSTOMERS.** With the increase in social consciousness on the part of the public, it is important that you inform your customers about the kind of company with which they are dealing. Urge them to see how your products are made by inspecting your plant and its working conditions. Let them know what wages you are paying, hours worked by your employees, what you are doing to secure and keep the good will of your workers and of the public.

•

These suggestions for improving your relations with your own employees and with the public, we repeat, are made in a spirit of helpfulness and not in a "know-it-all" way. They may serve to check up on your activities. Perhaps you are already doing many of the things outlined. Some of them may not be adaptable to your own special conditions. They are presented with the full realization that a company can adopt many of them only insofar as its resources and its own particular conditions permit. Management's first job naturally is to preserve its economic and financial stability for without that the business wouldn't last long.

As a final word, we reemphasize that no side of your business is more vital to your future success and to survival of the system of private enterprise than pleasant and understanding relations with your own people and with the public. After all, this country is ruled largely by public opinion and some day you may stand or fall as the result of the public's opinion of your company.

## How Many of These Things Are Practical For You to Do?

**THIS LIST represents a variety of suggestions, is printed for your convenience, and is not intended as a gage for rating the completeness of any company's public relations program. In deciding on how many of these things it can do, a company necessarily must be guided by such factors as the present status of its own program, by its plant's physical limitations, by its past relationship with its employees and with the public, by its financial position and by other considerations peculiar to its own situation.**

1. Put public relations under a responsible leader. ____
2. Make clear the authority of department heads. ____
3. Acquaint employees with your program. ____
4. Establish uniform rates of pay for equal grades of work. ____
5. Create financial incentives beyond an average standard. ____
6. Explain promptly to employees changes in pay rates. ____
7. Provide clean wash- and locker-rooms for employees. ____
8. Provide adequate sanitary toilets which are kept clean. ____
9. Make provision for employees' rest periods. ____
10. Set up lunch tables or establish cafeteria. ____
11. Provide sanitary drinking fountains. ____
12. Put guards on machinery for safety of operators. ____
13. Equip operators with goggles or other safety devices where needed. ____
14. Set up a plant safety program. ____
15. Provide scientific plant lighting. ____
16. Do everything possible to eliminate plant noise. ____
17. Install equipment for removal of fumes, dirt and smoke. ____
18. Use flooring material least tiring to the worker in standing and moving around. ____
19. Install equipment to relieve operators of heavy lifting. ____
20. Provide good ventilation in winter and summer and proper plant heating. ____
21. Stabilize production, hence employment, to greatest possible degree. ____
22. Establish group insurance for unemployment, sickness, old age and death. ____
23. Operate a first aid and medical station under a competent attendant. ____
24. Install equipment to eliminate dangers arising from occupational diseases. ____
25. Provide some recreational facilities for employees. ____
26. Adopt an annual vacation plan which is fair to all employees. ____
27. Encourage employees to take part in civic affairs. ____
28. Encourage employees to establish savings plans and credit unions. ____
29. Create efficient and adequate machinery for dealing with employees' grievances. ____
30. Set up a procedure whereby employees are invited and urged to submit suggestions for improvement of your business. ____
31. Operate employee and apprentice training programs. ____
32. Recognize the foreman's importance and conduct foreman education meetings. ____
33. Inform employees and stockholders about your business by means of simplified financial reports. ____
34. Make informal reports to stockholders and employees about your problems and how you are solving them. ____
35. Hold "open house" at your plant to show it to employees' families and to townspeople. ____
36. Use motion pictures to show people what kind of plant you operate. ____
37. Establish regular tours of your plant. ____
38. Tell local merchants periodically about your business outlook. ____
39. Keep the professional people in your town informed about your activities. ____
40. Cultivate the good will of your customers. ____
41. Cooperate with local charities and character-building agencies. ____
42. Cooperate with other local manufacturers in telling publicly the facts about the importance of industry to your community. ____

# *What* MACHINES *Mean to* BILL SMITH

MACHINES, like the weather, take a great amount of abuse from people. They are blamed for a variety of economic ilis—unemployment, over-production, enslavement of the worker. They are called the tool of the capitalist and the foe of the masses. They are pictured as a Frankenstein about to overwhelm their creators.

What is the truth? Has the machine raised or lowered our standard of living? Are we better or worse off in a mechanized world than in a world dependent on human physical strength? Is the machine a benefactor to mankind or a curse?

In an attempt to secure an answer to these questions, let's see what the machine has done for the factory worker and his family in their everyday life, what it has done for him in his home, what it has done for him in terms of food, clothing and shelter, what it has done for him in his work, and what it has done in revolutionizing his mode of transportation and in broadening his recreation.

These aren't sensational disclosures, but just a recital of facts available to anyone who wants to take the time to find them. The trouble is that we seldom pause long enough to look objectively at the problem. We are so close to the trees that we can't see the forest. Without further ado, then, we present our findings.

▼

## WHO BILL SMITH IS

Let's get down to earth and look at the life of a shop employee. For our purposes, we'll call him Bill Smith. Other workers' incomes probably aren't exactly the same as Bill's, varying to some extent up or down. A lot of the workers too are much younger and some of them older than Bill. On the whole, however, most factory employees spend their money and live in much the same way that Bill does.

Facts about Bill:

Operates a modern grinding machine in a factory employing around five hundred men.

Is 48, has a wife and three children, 19, 15 and 8 respectively.

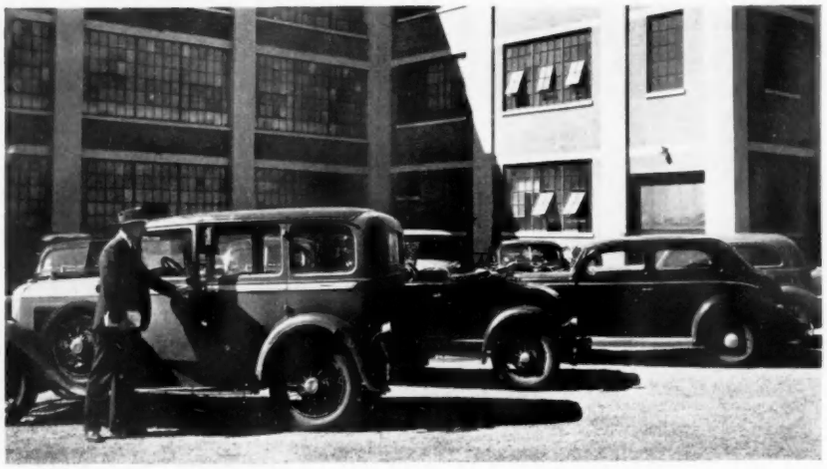
Lives in a small house which he bought for $4,000 and on which he still owes $1,900.

Earns an average of $1,600 a year, but has gone as high as $1,980 and as low as $1,325.

Has to do some tall figuring to make ends meet, but everything considered has a pretty good time out of life.

Has been working since he was fourteen and has been at his job as machine operator the past twenty-four years except during war service.

Is plunked down squarely in what is called "the machine age."



**BILL PARKS** his car in the company's parking lot. Most employees drive back and forth to work every day

# *What Machines Mean to Bill Smith*
## AT WORK

DURING the thirty-odd years since the day when Bill left school and went to work, a lot has happened to change working conditions. He can look back at the days when workers left home at 6:30 in the morning and didn't return until 6 at night. They worked straight through the day, except for a brief time out for lunch—a 10-hour working day.

Back in those days wages were about 25 cents an hour, as contrasted with 71 cents now. Bill himself is getting 80 cents, and since he works as a rule from 8 until 4:30 five days a week, that gives him an annual income of about $1,600.

Shops have improved, too, and are continuing to improve as fast as their physical limitations and financial resources permit. Some old plants have been torn down and replaced by new modernized ones. However, when that is neither desirable nor possible, conditions within the buildings themselves have been bettered and made safer and more attractive.

Bill's own experience happens to include a change-over from an old plant to a new factory. Bill now thinks of the old plant where he worked for many years as old-fashioned. Parts of it were poorly lighted and most of it was badly ventilated. Accidents were not uncommon, for safety attachments were not in general use and employees were not educated to be safety conscious. The management didn't pay much attention to such matters as wash- and locker-rooms and cafeterias. The men lifted big castings into position in machines; and running machine tools in those days required plenty of labor. The men walked around the shop a lot to get materials.

Now Bill works in a plant having an abundance of daylight. His present job takes little lifting. Even the men machining heavier parts do far less lifting than formerly, because conveyors, cranes, trucks, hoists and other devices make easy the task of shunting materials around. When the work is in place, operators press a button and the machines go into action. The men must know how to set the work accurately, but the actual machining process is automatic. Moving parts of machines are amply guarded.

More things are being done for Bill's personal comfort. At the lunch hour he gets a hot plate at the plant cafeteria where he can sit down with his fellow employees in clean surroundings. There are such conveniences as sanitary washstands, showers, a clean and orderly locker room and clean toilets. The shop has a first-aid station in charge of a competent attendant in case Bill disregards safety rules posted around the plant or in case something accidentally goes wrong. So Bill is pretty well off at work in the machine age.

**LUNCH TIME** is spent in the clean plant cafeteria where Bill and his fellow workers get food at low cost

**FIRST AID STATION** in charge of a competent attendant is available in case Bill disregards safety rules or something goes wrong

**CLEAN WASH-ROOMS** are located in each department of Bill's factory for the convenience of employees. This is an improvement over the old days

**LOCKER-ROOMS** have been installed for employees at Bill's factory. There are many other things done for their comfort which formerly were not done

## MAJOR ITEMS IN BILL'S YEARLY BUDGET*

**SHELTER** For house, including interest and payment on mortgage, taxes, upkeep and repair, Bill pays **$427.20**

**FOOD** For his family of four, on plain but substantial diet, Bill pays the grocer, baker, meat market and roadside stand a total of **$547.20**

**CLOTHING** Bill's wife looks well when she goes out. Clothes for the children are expensive. Bill doesn't spend much for his own clothes but altogether he has to set aside for clothing the family **$126.80**

**AUTOMOBILE** Like most of his fellow workers, Bill has a car. It's a 1932 used car for which he paid $295 on the installment plan three years ago. He drives to work in it, takes a vacation trip in it, uses it almost every day. He likes to tinker with it and makes most of the repairs himself. It costs him for the year **$123.20**

**RECREATION** There isn't too much left for recreation after the necessities are paid for. But Bill and his family manage to squeeze in a visit to the movies now and then and some picnics in the country on Saturdays or Sundays. They take a magazine or two and have a radio. Bill is able to get in some hunting, fishing and other sports. The cost of all this during the year is **$95.30**

**HOUSEHOLD OPERATION AND FURNISHINGS** Bill spends considerable for fuel, gas and electricity. He wants his wife to have as many household conveniences as possible. Once in awhile he buys new curtains or some household gadget for his wife. These items lumped together set him back **$102.40**

* The figures in this budget are based on data from U. S. Bureau of Labor Statistics on spending habits of American families. Though other workers' incomes vary upward or downward from Bill's, their expenditures for major items is in about the same proportion as his.

# What Machines

**THE BATHROOM,** where Bill's wife is seen supervising the job of getting the dirt off her 8-year-old son, has modern plumbing and fixtures. Imitation tile gives the room an attractive appearance. Bill can look back to the days when toilets were in the backyard

**BILL'S HOME** is among a row of neat houses in a part of town where factory employees live. He takes considerable pride in it, keeping its exterior and surroundings attractive, as you can see in the above picture. It contains many conveniences

**WASHING** is a task which Bill's wife no longer dreads. It used to be that she had to spend most of a day each week over the wash tub and another day ironing. Machine-made washing machines now enable her to do the family washing in about two hours. Electric irons ease the job of ironing

# *Mean to Bill Smith* IN HIS HOME

**IN THE LIVING ROOM** the family gathers after dinner. Bill reads the newspaper and later will listen to his favorite radio program. His son is in the basement firing the furnace. On the floor of the well heated house are the other children and the son's girl

THOUGH any wife and mother will tell you that she is busy from morning until night, Bill's wife admits that things are looking up for her as well as for Bill. For proof of that fact, she only has to recall conditions at the time that Bill and she were married and got themselves a little house in a modest part of town.

The comforts of home in those day's weren't what they are now, especially in Bill's income group. He and his wife knew of furnaces and electric lights and mechanical gadgets and modern plumbing in more prosperous homes, and wondered whether they would ever have such equipment for themselves. Instead of a central heating plant, they had only a big coal stove in the living room and a wood range in the kitchen. When the temperature went down in winter, the family huddled around the living-room stove. When zero weather came, the rest of the house was abandoned and the family lived in the kitchen. None of the bedrooms was heated. You had to pile on enough blankets to keep warm and cover up your head in the bed clothing if things got too bad. You took a bath in a big tub of water heated on the kitchen stove. The toilet facilities were all out in the backyard.

Bill's wife did the cleaning once a week with her good right arm, dust cloths, mops, brooms and a hand sweeper, and it was a big job. She spent the better part of a day each week over a washtub. Then another day was taken up with the ironing. She had two irons, one being heated on the kitchen stove while she was using the other. But the trouble was that the heat in the iron was never uniform because the iron in use quickly got cold, making ironing a whale of a job.

One could go on for pages about the lack of equipment which made Mrs. Smith's housekeeping task a tough one. She likes to reminisce about those days mainly because today's conditions are in such pleasant contrast. Today the house has a hot-air coal furnace which provides a pretty even temperature in all the rooms. There is hot and cold running water in the kitchen and in the bathroom on the second floor. An inside

toilet has replaced the one in the backyard.

It would be stretching a point to say that Mrs. Smith is able to buy all the mechanical help that she would like to have. If she did, Bill's pocketbook wouldn't stand the strain. But she does have lots of assistance that she formerly didn't have. The kitchen coal range has been replaced by a gas range. The kitchen cupboard houses an electric toaster. A small electric fan keeps the kitchen air stirring in hot weather. The next purchase Mrs. Smith hopes to make is an electric mixer. In the hall cupboard is an electric vacuum cleaner and electric iron. No longer does Bill's wife hang over a washboard; instead she uses a washing machine with wringer attached. Recently Bill stepped out and got her a used electric refrigerator on a time payment basis. There are other gadgets too numerous to mention which ease the job for her. When she stops to think about it, she is mighty glad that the widespread use of machinery in factories has made all of these products inexpensive enough to be available to her.

**ELECTRIC REFRIGERATION** is a recent addition to Bill's household equipment. He got this unit, like the radio, second-hand, but already his wife looks on it as indispensible. She wonders how she used to do without it. Mass production of refrigerators has brought the retail price down to a low level

THE GAS RANGE, while not of the newest design, is one of the conveniences in the kitchen for which Bill's wife is thankful. She can remember the days when she learned to cook at home on a wood-burning stove

**CLEANING THE HOUSE** isn't the job that it once was for Mrs. Smith. She now owns a vacuum cleaner, priced low enough that she could afford to buy it. With its help she can do in a short time what it used to take her many hours of hard labor to do

# *What Machines Mean to Bill Smith*
# IN FOOD SUPPLIES

BILL SMITH likes good food and plenty of it. And he likes it fresh and clean. That's the way in which he gets it because machines have made it possible for the grocer and the meat market and the milk man to sell him packaged, sanitary foods.

In Bill's younger days he wasn't so finicky as he is now. He was satisfied for the corner grocer to sell him sugar, rice, flour and crackers out of open barrels. Most articles, in fact, were sold in bulk and handled by hand, were weighed out on the store scales. Big slabs of meat were brought out of the ice house and hung on hooks during the day, being carved by the butcher as needed. Now Bill's wife trades at a sanitary food market where meats and other food are kept in refrigerated cases and where packaged foods are a delight to the eye.

Let's go back to the farm itself and see what happens to Bill's food. And let's take a look at what machinery has done to make the farmer's production more efficient and his life less isolated. It used to be that the farmer and his wife toiled from sun-up to sundown, depending mostly on their own muscles and those of a hired man or two to get the work done. Ploughing and harvesting were back-breaking tasks. When harvest time came, the farmer depended largely on transient labor for necessary additional help. He and his wife seldom got to town, because the journey by horse and buggy was long and tiresome. When not snowbound, their children walked through all kinds of bad weather to the little red schoolhouse with a single room and one teacher for all the grades. The rural postman and the local grange were the main contacts with the outside world. They used oil lamps and had a wood stove in the kitchen. The water supply came from the pump in the yard. Instead of modern plumbing there was an out-house.

Contrast this with the trend in present-day farming. Tractors now provide much of the horsepower. Me-

*Brown Bros.*

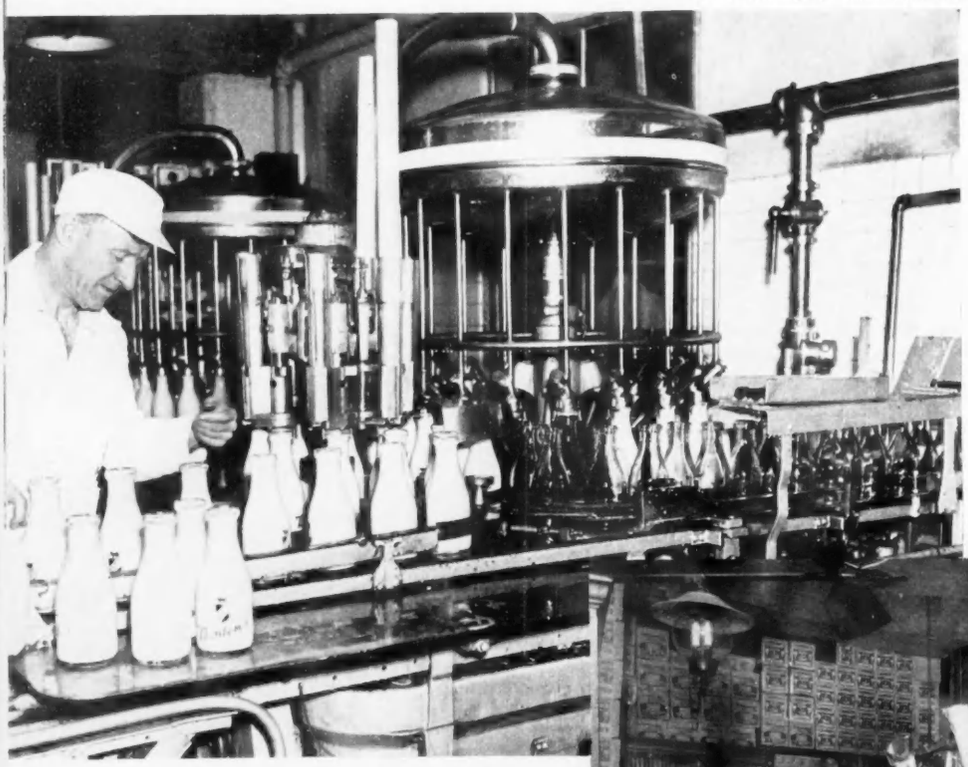
**1938 VS. 1914.** Bill's wife now buys her groceries in a sanitary food market (above) where food is cleaner, fresher and more attractively packaged for easy handling in the kitchen than it used to be. This improvement is traceable to changes wrought by mechanization on the farm and in food plants as well as to modern refrigeration in retail food stores. Contrast this with the old corner grocery (below) where much food was sold from open barrels by hand

chanical implements, owned sometimes by four or five farmers pooling their resources, do the major part of the field work so that the farmer is gradually freeing himself from dependence on transient labor at harvest time. He is able to do in one day what it formerly took him days to do. Farms are being electrified. The house has modern plumbing, and with electrification all of the modern equipment which lightens the housekeeping burden of the city wife is becoming available to the farmer's wife. The children are picked up by a school bus and carried to a central school with an adequate teaching staff. With roads open all winter and a car in the barn, the farmer and his wife can run into town whenever they feel like it. A radio keeps them entertained and informed of the daily news. Much of the work connected with growing crops, raising chickens, milking and caring for cows and keeping all the farm animals in good condition is getting onto a scientific basis and is tied in with the use of mechanical gadgets. The farmer is just as much in touch with everyday affairs as city folk and his methods of production are being modernized. Without machines, all of this would not be possible.

But to return specifically to Bill Smith and his food supply. His milk is carried from country pickup stations to dairies in stainless steel tank-trucks, is purified by mechanical methods at the dairy, and is delivered to his door in bottles or parchment containers made mechanically. Much of the packaged food which he buys is not touched by human hand in the manufacturing process—and that goes for meats too. Yet the process of preparation takes a lot of human labor. Bill's wife buys canned foods so cheap because of mechanized production that it doesn't pay her to put it up herself. Fruits and vegetables reach her grocer the same day they are picked or the day after, thanks to truck hauling, fast railroad freight service, and mechanical refrigeration.

Machines on the farm and in food plants have brought definite benefits to Bill. His food is cleaner, fresher and more attractively packaged for easy handling in the kitchen than it used to be. And Bill knows that the risks of buying contaminated food have been reduced almost to zero.

*Photo Courtesy of* The Borden Co.



**BOTTLED MILK** delivered to Bill's door goes through several mechanical processes before it reaches him. It is handled and pasteurized by machinery at the dairy. Above you see the bottles being filled. Milk is taken from country distributing depots to dairies in stainless steel tank-trucks

## BILL SMITH'S

**MEAT MARKETS** like the one below were the general rule in Bill's younger days. Slabs of meat were brought out of the ice house and hung on hooks during the day, being carved by the butcher as needed. Such methods are largely prohibited by law now

*Brown Bros.*

*Photo Courtesy of* Minneapolis-Moline Co.

**REMEMBER THE DAYS** when all farming was done with horses, and ploughs were guided by hand? That way of doing things hasn't entirely passed out yet, but each year fewer farmers are without mechanical help. With electrification of rural areas being pushed ahead, all of the modern equipment which lightens the housekeeping burden of the city wife is becoming available to the farmer's wife. The work of raising chickens, hogs and cattle is getting onto a scientific basis, benefiting the farmer

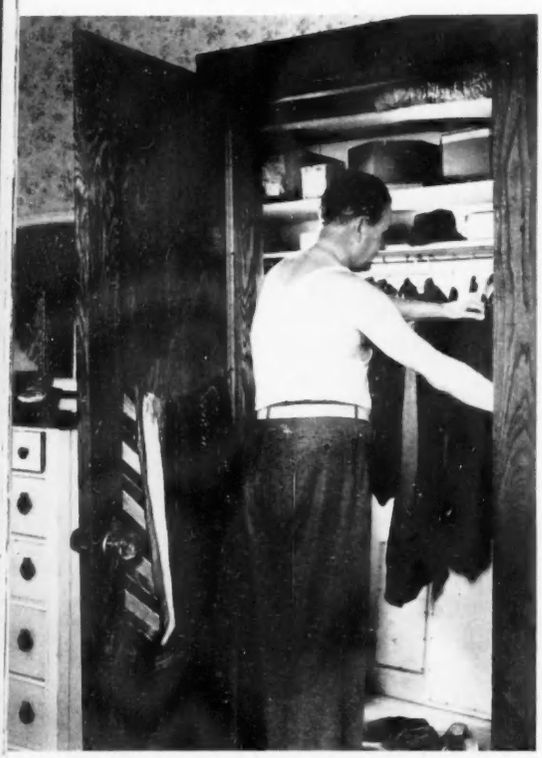
**MECHANIZED EQUIPMENT** is rapidly changing the farmer's crop-raising methods and easing his tasks as well as freeing him from dependence on transient labor during the harvest season. Thanks to machinery, the farmer's life is less isolated today

*Brown Bros.*

## FOOD SUPPLY

**BUYING MEAT** is a pleasant task for Bill's wife today. It is kept fresher than in the old days because all day long it is in refrigerated cases where customers can see it and choose what they want. Risk of buying contaminated meat has been reduced sharply

# What Machines Mean to Bill Smith



WHAT TO DO about clothes is a problem with every family, and Bill's is no exception. It wasn't so many years ago that a person on Bill's present income had little variety in clothes. The wife had a good dress for parties and for church and one or two other dresses for ordinary every-day wear. The head of the house thought he was lucky if he had two suits, one for Sunday and the other for general wear. The children managed to get by on a pretty skimpy wardrobe.

But the widespread introduction of machinery into the textile industry has changed all of that. It has brought into being new low-priced materials such as rayons. It has put the textile industry onto a production basis whereby it can afford to make better clothing and sell it for less money. Scarcely in any other phase of the life of Bill's family has mechanization done more to benefit every member than in the matter of clothing.

Here is Bill today with several suits and several pairs of shoes and so many ties that sometimes he has a hard time making up his mind which one to wear. And this is not taking into account his work clothes.

His wife has even more variety. She hasn't paid more than $7.98 for any dress, but she has a number of them. On top of that, she owns numerous house dresses which cost her $1.79 each. A flock of shoes, hats, stockings and coats complete the array. You understand, none of this clothing is expensive. Its relatively low price gives Bill's wife the same opportunity to change with the seasonal styles that Mrs. Stuyvesant Smith-Mathews has had for the past twenty-five years.

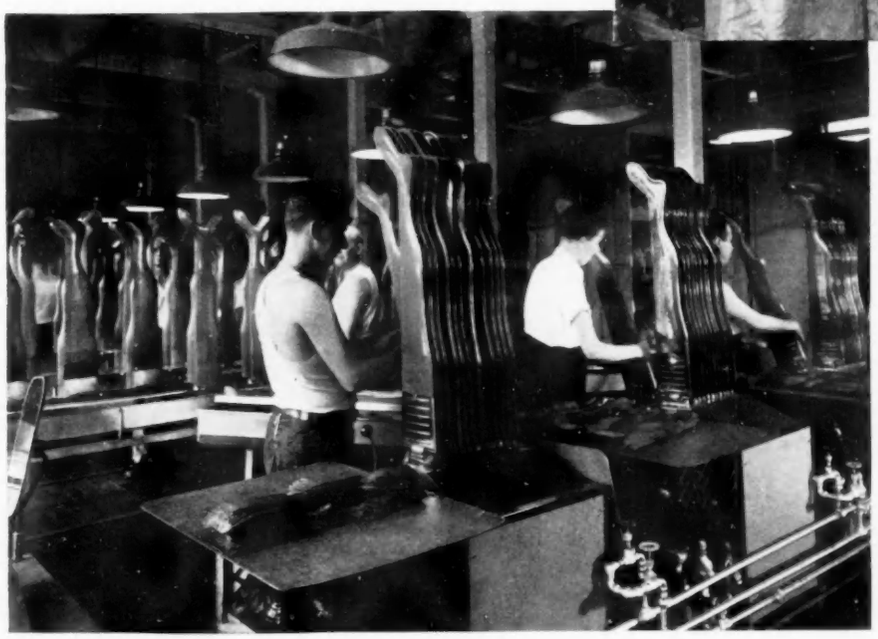
And don't forget the children. Their closet full of clothes is something to look at, too. All of which makes living more pleasant. Mechanization as applied to the manufacture of wearing apparel has done a lot to give Bill and his family more of the things which they want.

**LOW-PRICED CLOTHES,** the result of the widespread introduction of machinery into the textile industry, has made it possible for Bill to have several suits, several pairs of shoes and so many ties that he has a hard time deciding which to wear

**BILL'S WIFE** is able to keep abreast of the seasonal styles because low-cost clothing is now available to her. Though she doesn't pay much for any one item, she has a flock of shoes, hats, stockings and coats, along with numerous house dresses

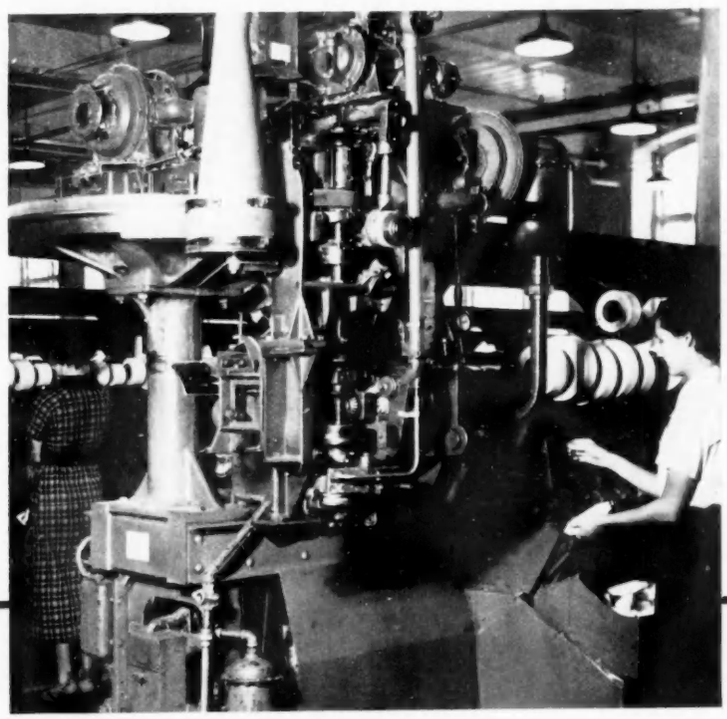
# IN CLOTHING

**BILL'S DAUGHTER** doesn't suffer either from lack of clothes. In fact, she has a closet full of them. It wasn't so many years ago that a family on Bill's income had few clothes and the children got by on a skimpy wardrobe. Mechanized mass production has changed that by lowering prices



**HOSIERY COSTS** have come down for Bill's family because productivity per worker in the textile industry has been greatly increased by the use of machinery. Silk stockings for Bill's wife and daughter are now within the range of his purse

**MODERN SEWING MACHINES** and modern textile machinery have replaced less efficient equipment in textile mills. They enable workers to earn higher wages and to produce more goods. The savings in production costs mean lower prices



# *What Machines Mean to Bill Smith*
## IN TRANSPORTATION

**BILL'S CAR** is in use a good part of the time. Bill drives to work in it, does shopping in it, sees the countryside in it. Here you see Bill's son and his girl going out in it to have a good time

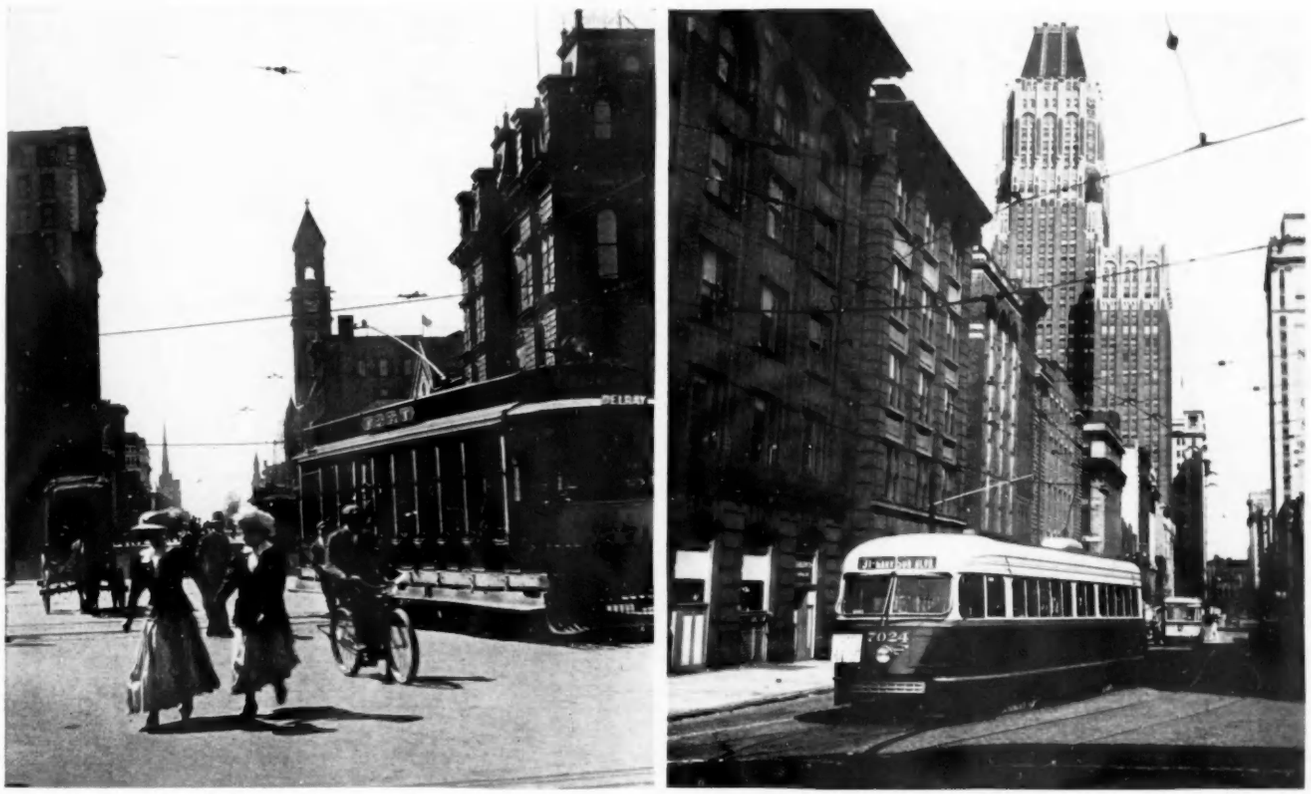
THE OLD CRATE, as Bill Smith's son likes to call the car, is a part of the everyday life of Bill and his family. Bill drives to work in the morning and back home in the late afternoon. On Saturday mornings he and his wife do their week's marketing in it. The son uses it to take his girl out to a dance or to the movies. During nice week-ends Bill and the family ramble around the country in a carefree way. On vacations, when they have a little money to spend, they go out to see the world in the car.

Back in his earlier days Bill didn't get around the way he does now. His income then wasn't big enough for him to own even a horse and buggy. He traveled to work on a street car. But in came automobiles and revolutionized the way of living. Thanks to machines, which enabled car manufacturers to improve their products and lower retail prices, Bill today isn't without a car.

In the automobile business more and better machines and more and better jobs go together. The history of building automobiles shows that when the best and most up-to-date machinery is used to give customers better products, the business grows fast and jobs and wages grow even faster. And the far-reaching effect on other industries is to create jobs which previously didn't exist.

Let's take a small dose of interesting figures to prove the point. Back in 1914 the output of automobiles was only 569,054 units principally because a person had to pay around $1,475 for a car. But the coming of mass production through the use of ingeniously designed machines made it possible for the industry to turn out many more cars for much less money. The result: in 1937 over 5,000,000 cars were built and the average selling price was around $650. Along with the sharp reduction in price since 1914, the 1937 buyer got a much bigger and better car, so greatly improved in performance over the 1914 car that a contrast of the two would be painful.

Yet the widespread mechanization which today brings an automobile within Bill Smith's price range has amazingly increased employment rather than decreased it. U. S. Department of Labor figures reveal that the average number of manweeks of

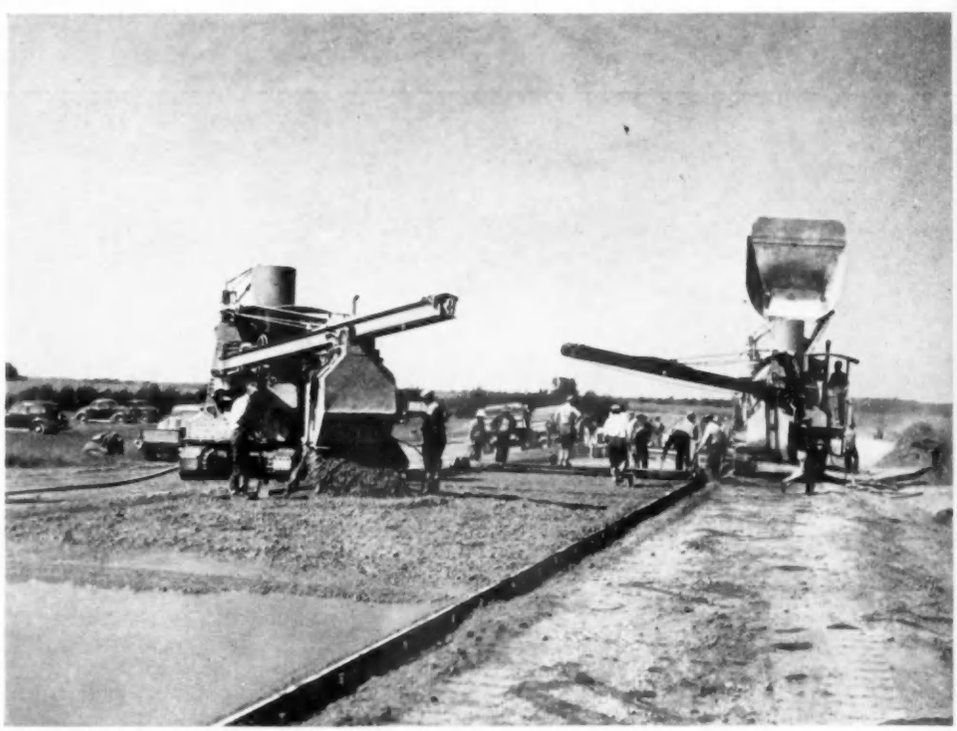



**TROLLEY CARS** formerly were like the one seen at the left. For a number of years Bill rode to work by trolley. That was before the days of cheap motor car transportation. Today millions of people are riding on trolleys, but they ride more swiftly and more comfortably than they used to in cars similar to the one at the right. Lighter alloy steels, better bearings, more insulation, better springs and other features manufactured by machinery are responsible for these improvements

employment to build a car was higher in 1937 than in any previous year of comparable volume.

But the effect of Bill Smith's owning a car doesn't stop with his buying of it. The car can't run without gasoline and oil. It has to be serviced. And the car doesn't do Bill much good unless there are good roads over which to ride. All of these demands by Bill and 27,000,000 other people who own and drive automobiles have created new giant industries.

HUNDREDS of thousands are making and selling gasoline, oil and car accessories. Hundreds of thousands more are building new roads and improving and maintaining old roads. Millions are earning a living as chauffeurs, truck and bus drivers, garage and repair shop employees. Altogether over six million people or one in every seven gainfully employed in the United States, owe their employment directly or indirectly to the automobile industry and its products. And cars selling at a low enough price that Bill Smith and his co-workers could buy them would not be possible were it not for machines.



**ROAD BUILDING** is only one of many occupations in which employment has been amazingly enlarged by automobiles, which are the product of mechanized mass production. Motor transport gives employment directly or indirectly to more than 6,000,000 people in the U. S.

# *What Machines Mean to Bill Smith*

## IN RECREATION

**A FAMILY PICNIC** is not an unusual event, now that Bill doesn't have to work the long hours that he did for years and that he has Saturdays and Sundays to himself. It is easy to get into the country in the car

**MOTION PICTURES** wouldn't be possible on today's scale were it not for the mechanical developments in the industry. Here you see Bill and the family just coming out of a movie theater. The movies have brought low-priced entertainment

**SWIMMING** is a sport that the children in particular enjoy. Bill and the family go out frequently to a lake nearby, taking along bathing suits and a basket full of food. Sometimes they rent a canoe or rowboat. Outdoors life is no stranger

SHORTER HOURS, the five-day work week and higher wages have made it possible for Bill to enjoy life more than he ever did before. In the early days he didn't have much time to relax and to do things with the family. But today he has the leisure which he has always wanted.

He gets home early enough that he can take the family in the car out to a park for a picnic supper in the summer time. Before he does that, he can work out in his garden for half an hour, weeding, hoeing and seeing that things are in good shape. He has the time in which to raise a good part of the vegetables for the family table, and they taste especially good out of his own garden.

After supper Bill generally sinks down into a chair alongside the radio to read the evening paper. When he has finished browsing through the news, he turns on the radio and settles back to enjoy himself, sometimes listening to a comedy bit or a speech or some good music. Once in a while he and his wife and the children stroll down the street a few blocks to the movies. Bill seldom stops to think about it, but the big talkie productions from Hollywood couldn't be made and put before his eyes if it were not for the amazing mechanical developments in the movie industry.

Bill has a phone in his house which his son monopolizes three or four nights a week to call his girl friend. A few of the neighbors who don't feel that they want to spend the money for phone service use Bill's phone, thereby helping to reduce the cost. If Bill lived in most any other country, he wouldn't have a phone, because the cost would be prohibitive.

Outdoors sports appeal to both Bill and his family. It is only a short drive in the car to a lake where the children can take a dip or can go canoeing. Bill likes to go out now and then with a few old cronies and fish; since his work-week starts on Monday morning and stops Friday afternoon, he has plenty of time for fishing. There is one annual event in Bill's life which has assumed the status of a ritual. When the hunting season starts in the fall, Bill takes the first opportunity to go off with a few friends or with his son on a rabbit hunting expedition. Golf used to be a rich man's game, but it isn't any longer. Bill, if he chooses, can play on the public links for fifty cents for an eighteen-hole round.

During the vacation season Bill and the rest of the Smiths pile into their car and off they go for five or six days, taking in such spots as Niagara Falls. It doesn't cost them much except for gasoline and oil, a cabin in a tourist camp and eating at roadside lunch rooms. Once a year Bill's wife goes to a city 150 miles away to visit an old friend. She travels by day-coach on the railroad, because Bill needs the car to get to work. What a difference in traveling conditions. No longer dirty old wooden coaches, stifling in summer and cold in winter. Bill's wife rides in an all-steel air-conditioned coach with individual reclining seats. This improvement is due to technological advances in steel, air-conditioning and a number of other industries.

Altogether, Bill is free to do as he pleases a good part of the time and he takes full advantage of the chance. The machine age, which enables him to produce more goods in a shorter time by means of machinery and thereby earn more money, has brought him a greater enjoyment of life in general.

**FISHING** is a form of relaxation that Bill loves to indulge in now and then with a few of his cronies. They go off in a car early in the morning and don't show up until evening, having a swell time meanwhile with rod and reel, both produced by machines

**HIS GARDEN** is one of Bill's hobbies. It is a profitable hobby, because he raises a lot of the vegetables for his table in it. He gets home early enough so that he likes to spend a half hour or longer working in it. All of his tools and garden clothes are machine-made

**HUNTING** assumes the form of an annual ritual for Bill every fall. Since his son has grown up, Bill loves to take him along on his annual pilgrimage which is mostly in pursuit of rabbits and ducks. Machines have brought their guns within their price range

# . . . And There Are 8,000,000 Bill Smiths

YOU HAVE SEEN in the foregoing pages how Bill Smith works and lives. It is the kind of story that can be duplicated in hundreds of cities, towns and villages throughout the United States, for there are over 8,000,000 Bill Smiths working in American factories. Because of what machines have been able to produce for them in mass quantities at low prices, they are enjoying as necessities products which in other countries are considered as luxuries. And they have to work much fewer hours to earn the money with which to buy those products than people in less mechanized countries. The reason for this is simple—the free and unrestricted development and use of machines have greatly increased productivity per man compared with workers in any other country in the world.

Here are what the statistics show: In the United States one out of every four persons owns an automobile (that means there is scarcely a home without a car), whereas in France only one out of nineteen has a car and in all other countries cars are less widely owned. No other country remotely approaches the United States in the use of such commonplace articles as washing machines, refrigerators, vacuum cleaners, bathtubs, electric irons, electric toasters, radios, telephones. No other country so widely uses electric power in the home, in industry and on the farm. No other country has attained the same high standards in cleanliness and sanitation in preparation of food, from the farm to the dinner table.

And what are these products costing Bill Smith in the time that he must work in the factory to earn the money with which to buy them? For every hour that Bill puts in at his machine toward purchase of a radio, the Frenchman must work four and a half hours to buy the same type of radio, the Englishman five hours, the Italian six. For every hour Bill spends at work toward buying an automobile, the Englishman must spend over four, the German six, the Frenchman almost nine. And the same ratio favors Bill Smith in the purchase of other products. No matter how you look at it, he is in a better position than workers in other lands.

Americans seldom stop to look at the breath-taking figures on what they consume. In capsule form, they are as follows: with only six percent of the world's land area and seven percent of the world's population, the United States consumes half the world's coffee and rubber, three-fourths of the world's silk, one-third of the world's coal, two-thirds of the world's oil, contains half the world's communication facilities and electrical energy capacity.

At the same time that the 8,000,000 Bill Smiths are leading the world in buying the most goods for the least effort, they have more leisure than workers in almost any other country. They are working the shortest number of hours at the highest hourly rates ever known. And they get around the country in their cars in a way that makes workers in other countries gape in astonishment.

All of these benefits are traceable to the machine. Mass production is dependent on a highly mechanized industry, and low prices to the millions of Bill Smiths are in turn dependent on mass production. Mechanization brings, as we know, problems of readjustment in employment, but increasing demands plus courage and good judgment have solved and will continue to solve these problems.

The shortened hours, the higher wages, the increased purchasing power and the added comforts of life make Bill Smith and his wife and children grateful to and proud of the forces that have made America the most industrialized of nations.

## *WHAT THE RECORDS SHOW*

Factory employees averaged 24.7 cents an hour in 1914, whereas in 1937 they earned 71.6 cents an hour. In the same span of years their work-week was shortened from 51.5 hours to 40.5. Their weekly paychecks in 1914 amounted to $12.72, contrasted with $29 in 1937. That is an increase of 128% in income. Yet the rise in cost of living, 1914 o 1937, was only 40%.

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All of the above leads to the fact that the worker today can buy more goods by far than his income allowed him to do in 1914. And most of the goods are of greatly improved quality today. The general adoption of machines in manufacturing industries has led to mass production, lower retail prices, shorter working hours, higher wages, more purchasing power.

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It is not because labor is cheap that Chinese coolies receive so little for their work. It is because their labor produces so little. A lathe increases many times the productive ability of the worker and enables him to earn more money. Machinery has done more than any other one thing to raise the American workman's standard of living.

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One out of every seven factory employees, due to development of machinery, is making a product unknown to his grandfather.

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Eighteen new industries have sprung from mechanization of manufacture since 1880. They have been responsible for direct employment of 1,123,314 people. That does not represent the total gain, because people must be employed to supply raw materials and to sell, transport and service the resulting products. Indirect benefit is that one out of every four gainfully employed today owes his job to one of these 18 new industries.

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Here are the 18 new industries: electrical machinery, apparatus and supplies; motor vehicles; motor vehicle bodies and parts; rubber tires and inner tubes; manufacture of gasoline; rayon and allied products; manufactured ice; aluminum; typewriters and parts; mechanical refrigerators; cash registers and adding and computing machines; cottonseed oil cake and meal; aircraft and parts; phonographs; photographic apparatus and materials; motion picture apparatus; asbestos products; radios.

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Machinery in use in American industry, measured in horsepower, increased 331% between 1899 and 1929. To this fact, which greatly enlarged productivity per worker, may be credited a gain of 479% in total wages paid. In that 30-year period the population increased 62%, number of wage earners 88%, production per worker 68%, wages per worker 209%.

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Only one-fifth of all wage earners were ever employed in manufacturing, and the proportion is as high today as in 1929. More than 71% of all unemployment in January, 1936, was in occupations other than manufacturing. It is believed the proportion has not changed materially since then.

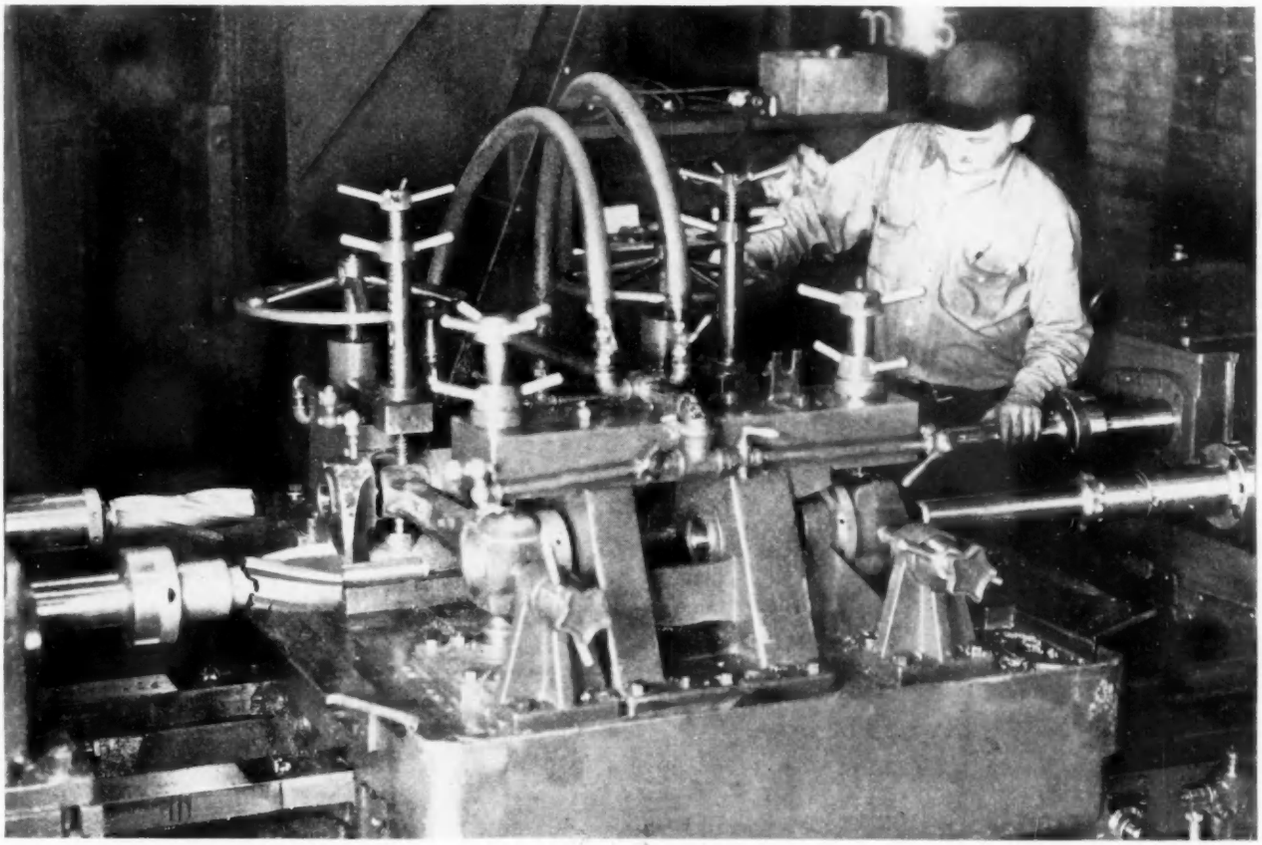

Fig. 1—Connecting rods, ranging from 9 to 20½ in. in length, are rough and finish bored at both ends in this Ingersoll two-way, four-spindle machine

# Tools for Tractor Parts

## Adaptability is the keynote of Minneapolis-Moline's method of equipping standard machine tools with versatile fixtures

R. R. WIESE
*Western Editor,* American Machinist

WHERE DESIGN improvements and the continual introduction of new models complicate the production problem, each purchase of a machining unit must be made with the future well in mind. Specially-arranged production machines have a definite place where manufacturing quantities are large enough to justify the cost of rearrangement when the job is done. However, if the machine must be used for a wide range of parts during its effective life, the general-purpose unit frequently is the most efficient in the long run.

General - purpose machines, equipped with jigs and fixtures to broaden their use, were selected by the Minneapolis-Moline Power Implement Company in preparing for the production of the small Model Z "Visionlined" tractor. Tooling was developed to suit the new jobs as well as others in an already developed line of larger tractors and general-purpose engines. No increase in floor space devoted to production operations was necessary because the multi-purpose equipment is used for a wide range of parts.

Use of the accurately made, sturdy jigs and fixtures facilitate precision results without recourse to expensive special-purpose precision machines. These tools have been designed for multiple use and are arranged so that set-up and handling times are held to a reasonable minimum.

Many of these tools have been provided by the builder of the machine on which they are used. This enabled him to meet specified requirements with less trouble than if he had furnished only the basic machine and the user has provided the fixtures. Even in these cases, the tools are of such nature that other fixtures can be substituted or the machine can be used without special work-holding devices for standard operations.

Future requirements have been kept in mind and only the most radical changes in part design will send

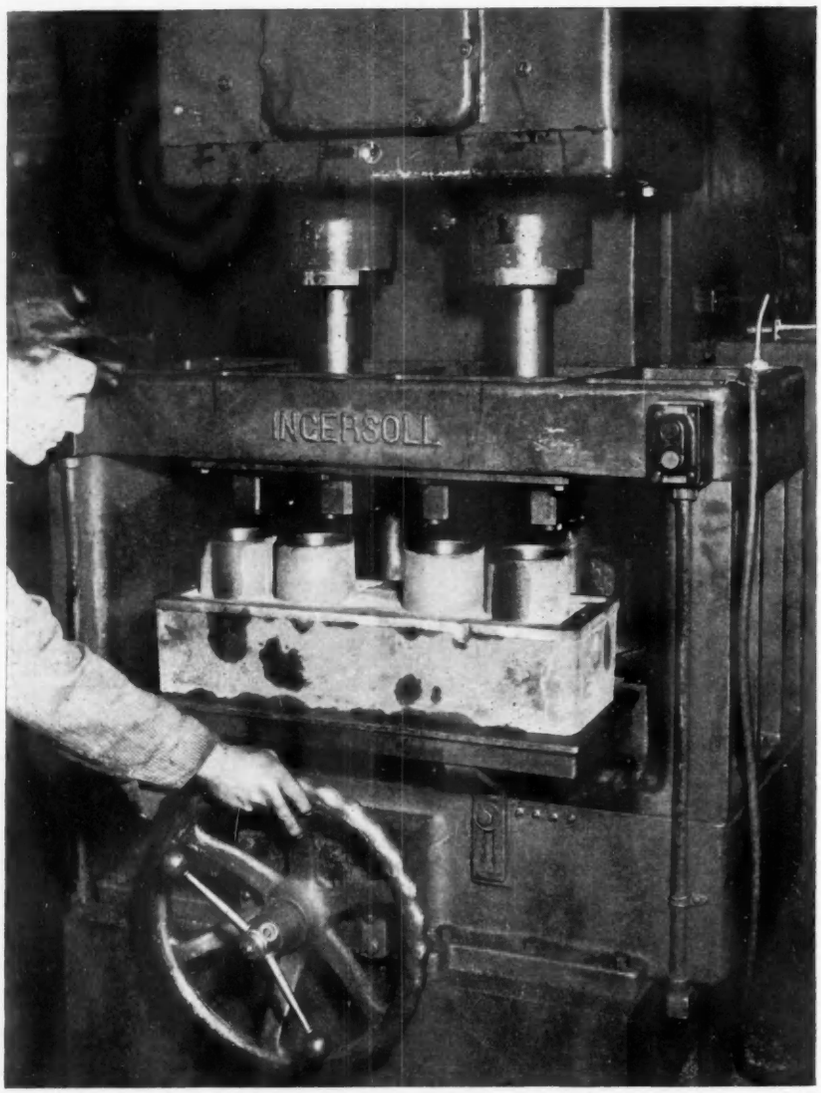


Fig. 2—Three sizes of engine blocks are rough bored in this vertical-spindle machine. Only locating blocks are changed in setting-up jobs

a machine to the scrap heap before its time. For example, although the boring machine for connecting rods, shown in Fig. 1, is used only for these parts, it will machine rods ranging in length from 9 to 20½ in. Certain Simplimatics are specially tooled for machining eight sizes of tractor rear-wheel cases, yet only a change in tooling and chucking fixtures will adapt them to other turning jobs. Operations on cylinder blocks are accomplished with a minimum of jigs and special machinery.

Both cylinder blocks, made of a special cast iron having good wearing qualities, and the corresponding cylinder heads are machined on the table of a rotary miller. They are clamped in a six-station fixture; then two sets of Stellite-blade cutters mill the top and two sides of two blocks and face mill two heads in one cycle. The fixture is arranged so that after the first cycle is completed the operator shifts each part to other positions so that surfaces on the opposite side are milled in the next cycle. Parts for 36 engines are milled per hour.

Next, the flange on the skirt side of the cylinder block is profiled in a No. 3 vertical miller at a speed of 22 in. per min. A tungsten-carbide tipped cutter is used. Dowel holes are drilled in the flange, then reamed to serve as locating points for all subsequent operations.

A vertical, two-spindle machine, Fig. 2, rough bores cylinder blocks for the Model Z tractor, also larger two- and four-cylinder blocks. It is necessary only to change locating blocks in the fixture to set-up for a

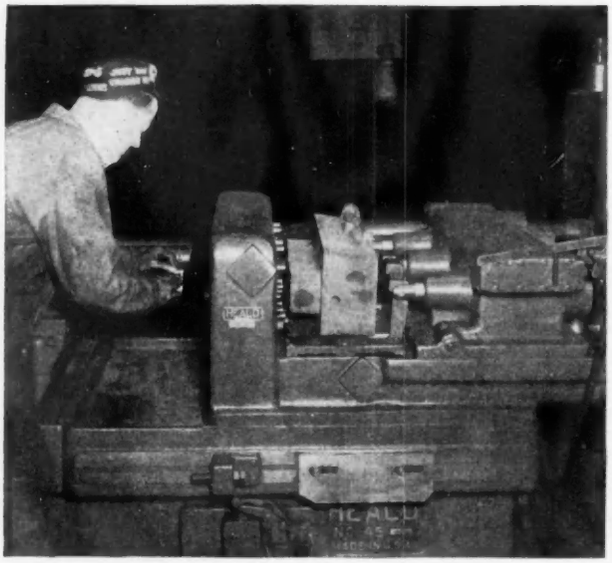

Fig. 3—This Heald "Borematic" finish bores all cylinder blocks, using single-point tools. Two Z-cylinder blocks can be bored simultaneously with but minor set-up changes from that shown

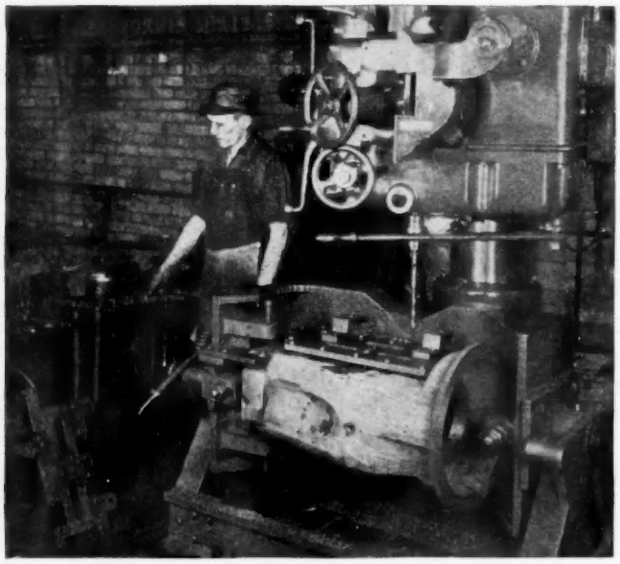

Fig. 5—Crankcases are drilled and tapped from four sides in this indexing jig and radial drill set-up. Drills and taps in quick-change chuck collets are arranged in order on a near-by rack

different block. The two spindles are spaced so as to machine alternate bores in the four-cylinder block. Six-blade tungsten-carbide cutters are used with a feed of 5½ to 6 in. per min. Since one of the two-cylinder jobs requires a blind boring operation suction is provided to remove the chips. Not only are chips prevented from accumulating in the bore to mar the work, but the air draft serves to cool the tools.

All cylinder blocks are finish bored in a horizontal four-spindle precision boring machine using single-point cemented carbide fly-cutters (Fig. 3). The only alteration necessary to change this machine from a two- to a four-cylinder block set-up is to replace the locating dowels and to move the spindles transversely to the proper center spacing. The clamp secures power from the regular hydraulic feed system of the machine. Spindles in this machine operate at 600 r.p.m. with a 2½ to 3 in. per min. feed. A suction pipe draws the chips out of the bores through a manifold surrounding the boring bars. The suction pipe delivers chips into a welded sheet-steel box on the floor beside the machine. A pipe from the top of the box leads up to the exhaust fan. Chip deflectors in the box prevent chips from being carried up into the fan. This arrangement has reduced fan blade wear considerably.

Radial drills are used instead of less versatile multiple-spindle machines for many operations because the variety of transmission cases, engine blocks and crankcases makes necessary frequent changes of drills, taps and boring bars. In addition, the quantity of any one size of part going through at any one time is so limited that multiple drills would require too many changes or too many machines to accomplish the variety of work. Single-spindle radial drills using master jigs and quick-change chucks make for flexibility and comparatively rapid work. Trunnion jigs facilitate many of the operations performed on these machines. The transmission case operation shown in Fig. 4 requires a detachable multiple-spindle drill head for six holes in a bolt circle located around a diaphragm opening inside the casting. Another trunnion-type jig is shown set-up on a Carlton radial drill in Fig. 5. Drilling and tapping of all holes in the top, side flanges and camshaft bearings of the RE crankcase is performed here. Drills, taps and reamers of various sizes are arranged in order on nearby tables for quick successive changes. After drilling and reaming operations are com-

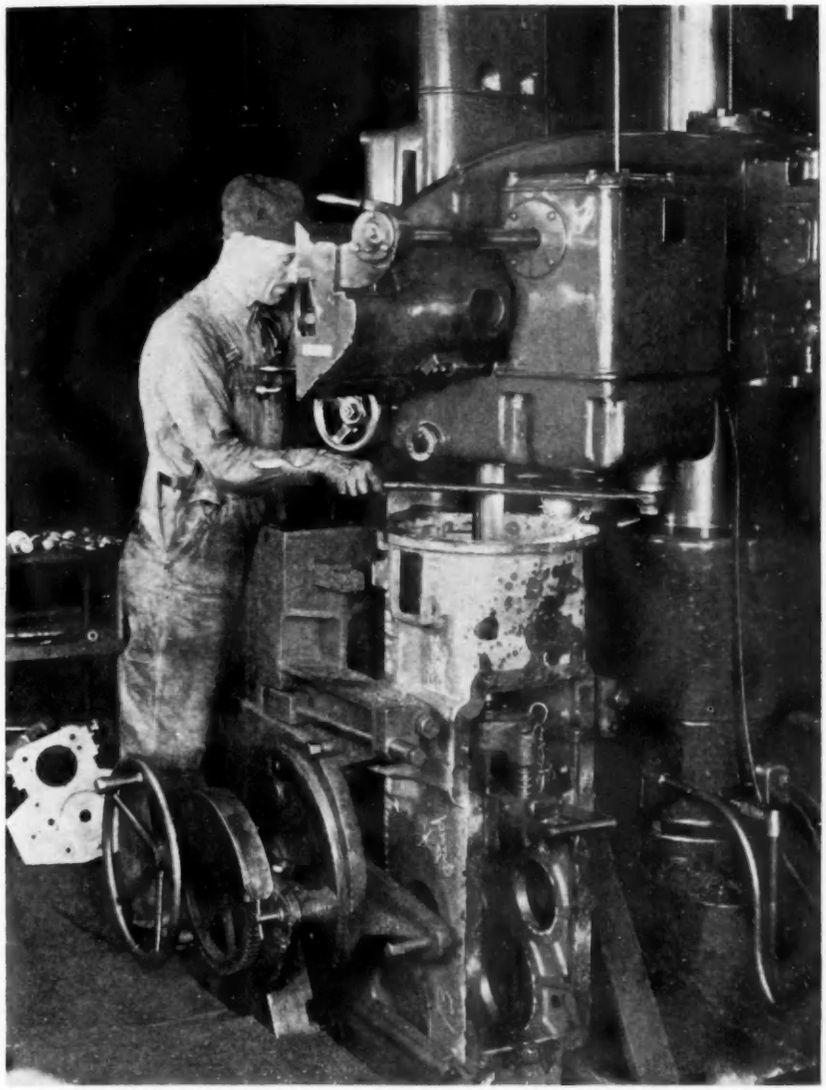

Fig. 4—A four-spindle drill head inserted through the side of the casting permits drilling six bolt holes around a diaphragm opening

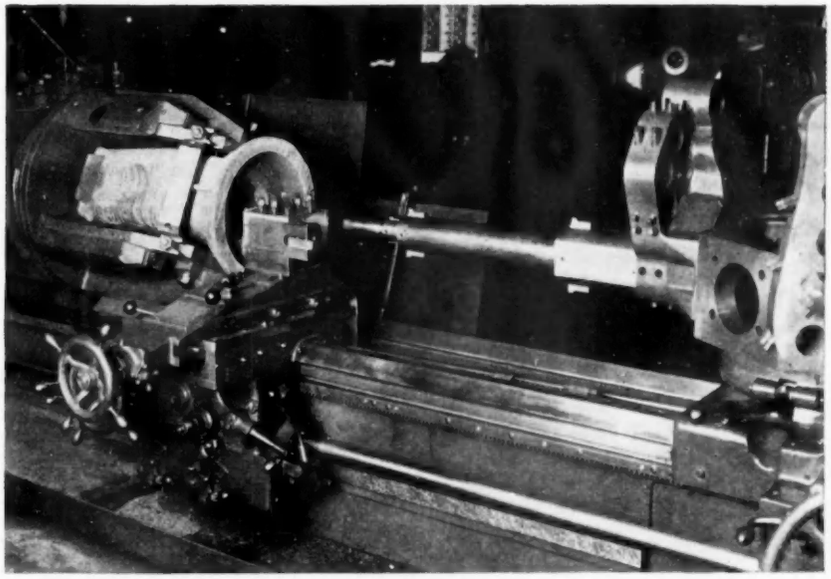

Fig. 6—Crankshaft bearing seats and the crankcase bell housing are bored and faced in this set-up on a standard No. 4 turret lathe. Tools are of different materials so as to give approximately the same life for the entire set in machining the different diameters

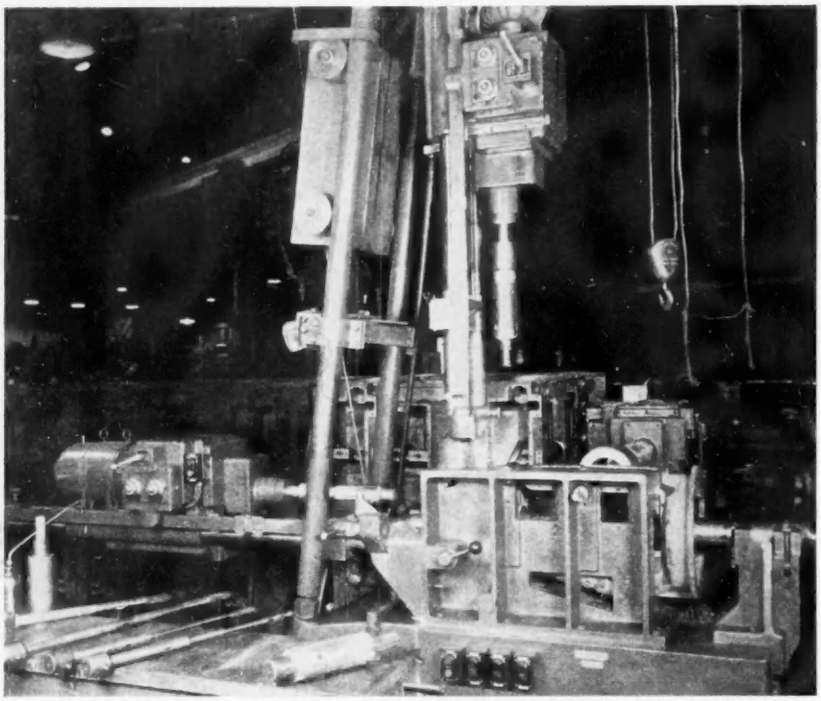

Fig. 7—Three Ingersoll "Power Pack" units rough and finish the camshaft and oil pump shaft bearings as well as the governor bore in the crankcase

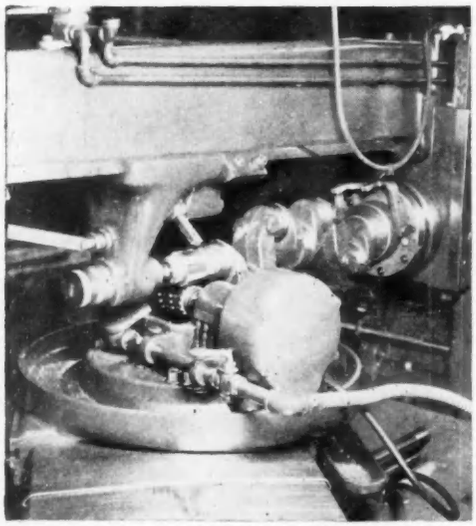

Fig. 8—Tapered splines are hobbed in the end of the forged crankshafts for the flywheel fit. Pads on the crankshaft cheeks later are drilled for balancing purposes

pleted, parts of the jigs are removed to leave room for tapping operations in the same machine.

A Warner and Swasey No. 4 turret lathe equipped with a special jig, Fig. 6, holds the crankcase for boring the main bearing seats. The crankcase drops into the open side of the jig and is held in place with four quick-acting internal and one external bridge clamp. The jig is balanced carefully, and the heavy overhang is carried by a 12-in. Timken bearing in the head. Carbide tipped tools are used for the large diameter turning and facing, Stellite for intermediate turning and facing, and high-speed steel for the small diameter, slow speed cuts. This insures approximately the same tool life for the entire set of tools. Boring, counterboring and facing of the bell housing also are included in the set-up. A male and female fit is used on the bell housing because it was found more suitable than a bolted connection.

Another versatile, high-production machine made from standard units is the three-unit Power Pack assembly shown in Fig. 7 and used for boring the camshaft bearings, governor mountings, and the oil pump bore in the crankcase. The case is held on a horizontal trunnion shaft. Tools on a nearby table are used for successive operations. Two men operate the machine, changing from one tool to the next as quickly as the preceding cut has been completed. The unit to the left first roughs the camshaft bore, using a long bar with tungsten-carbide cutters. This bar then is removed and a bar with a reamer on the end is inserted for finishing the camshaft bore. This bar has slots into which are slipped cutting tools for facing the camshaft thrust bearing surfaces inside the case. The power unit is backed up to a stop by a handwheel at the end for facing one side, and is advanced for facing the other side.

The vertical unit uses the first bar for rough and finish boring the large end of the oil pump drive bore down to the $\frac{3}{4}$-in. oil pump shaft hole. A pilot bushing then is inserted in this bored hole and a long drill is then put in the power unit for drilling the shaft hole. The trunnion which supports the casting has a pilot in it to guide the drill where the hole runs near the inside wall of the case. The reamer used to finish the $\frac{3}{4}$-in. hole is guided by another pilot hole which is brought into position by rotating the trunnion 180 deg. The unit at the rear requires only two sets of tools. The first has a core drill at the nose and rough boring and facing tools for the governor mounting. The second has a reamer at the nose and finish boring and facing tools for the governor mounting.

Crankshafts are forged from S.A.E. 1045 steel, heat-treated, then rough turned on an engine lathe using Stellite cutters. Line and pin bearings are rough and finish ground in a pair of Landis grinders. This shaft does not have a flange for attaching the flywheel by bolting. Instead, a taper spline is cut on the end of the shaft and the flywheel hub bore is taper reamed and spline broached so that the taper reaming seats on the bottom of the taper splines. This spline is cut in a Barber-Colman machine, Fig. 8, the hob being flooded with light cutting oil throughout the operation.

Pressure feed oil holes in the crankshaft are drilled from main to pin bearings in a Leland-Gifford deep drilling machine, two holes at a time. The shafts are then balanced in a Tinius Olsen machine on which an electric spark arrangement indicates the angular position and a visual reading micrometer scale the amount of unbalance. Correction is made by drilling out the required amount of material from the pads on the crank cheeks, which have been especially formed in the forging.

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## Hard Ways—*Correction*

R. W. Hutton, of Winsted, Conn. has called our attention to an obvious misstatement in the article "Hard Ways", describing the equipment used by Monarch for flame-hardening the ways of lathe beds (*AM*—Vol. 82, page 682). The third sentence of the sixth paragraph should have read "The oxygen and acetylene gases are passed underground through rubber hose to a special adjustable-drum mechanism, over which the hose passes up through the floor to the traveling carriage mechanism."

# Gears for Pick-Up Cams

**Formula permits selection of proper gears for timing pick-up cams to give desired feed per revolution on Brown & Sharpe screw machines**

R. M. BENNETT
*Bridgeport Works, Underwood Elliott Fisher Company*

OFTEN it is necessary to machine a part in a Brown & Sharpe automatic screw machine when the proper cam set is not available. Developed in actual practice over the past 20 years, the following formula serves as a guide in the selection of gears for timing any pick-up cam used on Brown & Sharpe screw machines so as to produce the desired feed per revolution of the spindle.

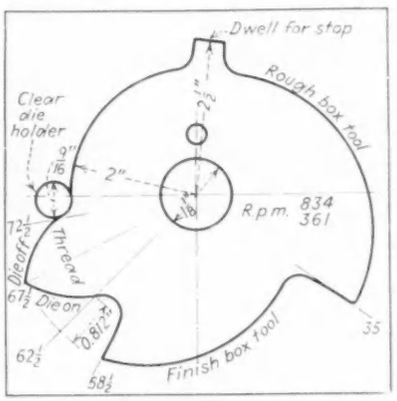
If we let $X$ represent the number of seconds for one revolution of the camshaft; $H$, the height in decimal inches of the thread lobe of the pick-up cam; $P$, a percentage of the pitch or lead of the thread to be cut, so as to give the die-holder the proper stretch-out; $S$, revolutions of threading speed per second; and $D$ equal the length of the segment of the thread lobe on the cam, measured in hundredths of the circumference; the formula is:

$$X = \frac{100\ H}{P\ S\ D}$$

When designing a thread lobe on the lead cam, it is common practice to use from 80 to 90 per cent of the pitch or lead of the thread. This is done so that the die-holder will have the proper amount of stretch-out during the threading operation. This is important, as the actual lead of the thread in the die must be greater than the advance per spindle revolution on the thread lobe of the lead cam.

The percentage selected should range from 80 for fine pitch threads, such as 56 to the inch, to 90 for coarse pitch threads in the range of about 8 to the inch. Conditions found on each job will vary and the set-up man should use his own discretion in selecting the proper percentage.

Let us suppose that a $\frac{1}{4}$-24 thread mild-steel screw, 1 in. long under the head and having a thread length of $\frac{5}{8}$ in., is to be threaded in a No. OG Brown and Sharpe screw machine. With this part in view, we select a set of pick-up cams designed to produce a $\frac{5}{16}$-18 thread screw, $1\frac{1}{8}$ in. long under the head and $\frac{3}{4}$ in. length of thread, as the set that most nearly matches the screw to be made.




**Lead cam for 5/16-18x1⅛-in. screw used in these calculations. The form and cut-off cams of the set are not shown**

The spindle speed for turning and threading the $\frac{1}{4}$-24 thread screw will be faster than the speed of these cams, and the proper threading speed from the tables on pages 258 and 259 in the book: "Construction and Use of Brown & Sharpe Automatic Screw Machines." The most suitable threading speed for a cutting speed of 30 surface ft. per min. is found to be 435 r.p.m. while 994 r.p.m. is selected for the other operations. Both of these speeds are, of course, faster than those on the pickup cam layout because of the smaller diameter screw to be made.

Dividing 435 by 60, we have approximately 7.3 revolutions per second. Length of thread lobe on the cam is found to be 5 hundredths of an inch and height of the lobe is 0.812 in. Using 87 per cent of the pitch for $P$, we have:

$$P = \frac{1}{24} \times 0.87 = 0.0416 \times 0.87 = 0.0362$$

Then, the time in seconds required for one revolution of the camshaft is found by substituting in the formula as follows:

$$X = \frac{100 \times 0.812}{0.0362 \times 7.3 \times 5} = \frac{81.2}{1.3+}$$

62 sec.

The nearest time in the gear table chart is found to be 65 sec. and the gearing will be the same as for the $\frac{5}{16}$-18 thread screw, or 34-110, 60-60. However, if we assume that the thread to be cut is $\frac{1}{4}$-28, or 0.036 in. lead, we have: $P = 0.036 \times 0.87 = 0.031+$. Substituting this value in the formula, we have:

$$X = \frac{100 \times 0.812}{0.031 \times 7.3 \times 5} = \frac{81.2}{1.13}$$

72 sec.

The nearest time in the gear table for the No. OG machine is found to be 70 sec., but we cannot use this value as the dieholder stretch-out always is shortened as the time in seconds is reduced. This reduction in time means that the die is being pushed on the work more rapidly and there is a danger of crowding the die on the piece. It is necessary then to select the 75 sec. time for one piece with the 58-86, 24-60 gears to match.

This formula also may be used for parts without threaded portions. For example, if a part with a drilled and reamed hole is to be made, the selected feed per revolution is substituted for $P$, as the feed per revolution is the same as the lead per revolution in such cases.

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A. GOODWIN
*Murray Corporation of America*

WHILE THE Murray Corporation has always trained apprentices, a definite program was not established until 1934. At that time a small group was placed under an instructor to receive training in tool and die making. As the group expanded, the boys were placed under a supervisor who devoted his entire time to organizing an effective training system and who was responsible for selecting each apprentice and assigning him the proper work under a department foreman.

Since that time, programs covering a four-year period have been set up for the following trades: mechanical engineering and tool and die making, electrical engineering and electrical maintenance, model and pattern making, drafting, steam fitting and air conditioning, production engineering and sewing machine repair.

Employees interested in becoming skilled in their chosen trades are given preference in applying for apprenticeship, but all applicants must be high-school graduates from eighteen to twenty years of age. The supervisor thoroughly interviews each applicant in order to make an analysis of his character, mechanical abilities and interests. The boy is made to feel at ease and is encouraged to discuss frankly his choice of vocations, his ambitions and abilities. He is closely questioned about his high-school record, the subjects in which he was most interested, his activities and even the type of literature he prefers.

If the application is approved, the supervisor goes to the boy's home and

talks to his parents to establish a common understanding between the parents, the boy and the company. They are given a complete description of the apprentice training program and are asked to encourage their son in his work and to cooperate with the company when necessary. Because the parent's influence has a great psychological effect on the boy's work, the supervisor endeavors to determine their attitude toward the boy's selection of a vocation.

When the applicant has been accepted for apprenticeship he is given oral and written instructions on safety practices, company policies and special rules of the management pertaining to apprentices. While working, the boy wears a uniform bearing the emblem of Murray apprentices, which gives him a neat, clean appearance, makes him easily distinguishable from other employees and enables the foreman to locate him in the department.

### Simple Tasks at Start

The new apprentice is taken to the department where he is to work and is placed under the direction of the foreman who puts him under a competent journeyman. The boy is first put on some simple work such as on a shaper, a lathe, or in the toolcrib where he is left until he has become accustomed to the shop atmosphere. During his first few weeks, in order to give him varied experience, he is moved to another machine for a while. Then he is returned to the first operation and is left there until he has completed the required time as set up in the schedule. However, if a boy progresses rapidly on one machine and his progress is slow on another, his schedule is changed to allow him the necessary time to perform all operations correctly and efficiently.

At the end of each month, the foreman makes out a report in which he grades the apprentice's work and ability as to safety habits, ability to learn, willingness to work, accuracy, productivity and personal habits.

In addition, each apprentice must fill out a daily card on which he reports the type of work performed, the number of hours worked, and the department in which he worked. At the end of the month this information and the foreman's report are recorded on the yearly apprentice record.

The apprentices are visited as often as possible in the various departments by the supervisor and his instructor. At this time the boys are encouraged to ask questions concerning their work and are given helpful information. When the required time has been completed ,the supervisor transfers the boy to another department where he will learn new operations and processes.

For one-half day a week, the apprentices are required to attend classes on subject matter closely correlated with the shop work. In addition, many detailed courses are given in night school. Although it is not obligatory for the boys to attend the night classes, they are expected to do so. Since the principal objective of apprenticeship is to learn, every boy is made to realize the importance of grasping the opportunity for advancing his education. At present, many of the more advanced apprentices are attending college at night, being enrolled in technical engineering courses.

At the end of each semester, quarterly reports are sent to the boys' parents. After the reports have been inspected the apprentices are gathered together in a group and are addressed by one of the executives and are given talks on various subjects. At the end of the meeting the boys having the highest standings are congratulated and encouraged to contine their successful efforts. Apprentices showing remarkable progress and exceptional ability are rewarded by an increase in pay.

No apprentice is retained who does not prove himself capable and industrious and whose school reports are not satisfactory. He may be discharged for improper conduct either within or without the shop and for breaking the shop rules. If the apprentice has any grievance or problem he is free to discuss it with the supervisor at any time. Such discussions are considered confidential and every effort is made to keep the boy satisfied and to build up a cooperative spirit.

An apprentices' club enables the boys to exchange opinions and to discuss technical problems among themselves. Monthly meetings give the supervisor an excellent opportunity for speaking to the boys in a group. Topics of interest to them are discussed, important announcements are made, and occasionally an outside speaker is invited to talk.

When a boy has satisfactorily completed his term of apprenticeship he is presented with a diploma in the form of a pocket-size booklet in which a complete transcript of his apprenticeship is recorded. He is thereafter entitled to be classed as a journeyman.

The boy's education at this point is not by any means considered complete. He has learned the fundamentals of his trade and has a working knowledge of it, but new methods, new developments and the constant improvements in machinery make continued study and learning necessary. The Murray Corporation's interest in the young journeyman will continue, since it is its intention to do all in its power to assure him of a successful future.

## Curriculum of Apprenticeship Course

*(Some subjects are covered in night classes)*

**FIRST YEAR**

- Shop Mathematics
- Technical English
- Industrial Economics
- Industrial Chemistry
- Principles of Engineering Drawing, and Body and Die Blueprint Reading
- Drafting and Views of Diagonal Sections
- Safety Practices
- Use, Care and Reading of Tools
- Machine Shop Technology

**SECOND YEAR**

- Applied Mathematics
- Metallurgy
- Shop Theory
- Die and Part Print Reading
- Practical Methods and Proper Machines to Use
- Construction of Problems
- Machine Shop Technology
- Compound Indexing

**THIRD YEAR**

- Metal Analysis
- Heat-Treating
- Arc and Acetylene Welding
- Panel Design
- Gear Calculating and Cutting
- Machine and Die Design (arranged to put former experience into practice)

**FOURTH YEAR**

- Motion Study
- Elements of Supervision
- Strength of Metals
- Tool and Die Design

**PRESS WORKING OF METALS • NUMBER 5**

# Automatic Feeds For High-Speed Press Work

**Roll, slide and hitch feeds for coil and strip stock, and transfer attachments for blanks or shells, permit maximum output and safety**

C. W. HINMAN
*Tool Engineer*
*Kobzy Tool & Electric Mfg. Company*

QUANTITY blanking and forming of sheet metal-parts has increased so enormously in recent years that considerable development has been necessary with respect to mechanical feeds. These feeds are applied to both gap- and straight-side presses. Gap-frame presses operate at moderate speeds, but straight-side presses are often run so fast that the feed becomes the limiting factor. Inertia of the feed parts in being started from rest, moved a considerable distance and brought to rest again in a short interval of time tends in extreme cases to pound the feed to pieces, or to cause inaccuracies and over-riding that can not be overcome by pilots or allowances in the dies. Press builders and manufacturers of feeds endeavor to meet this situation by incorporating welded, tubular construction and hardened and ground alloy steels in their mechanical feeds.

### Automatic Roll Feeds

These devices are made in two styles: single or double rolls. The single-roll type, Fig. 19, is employed when the material strip is heavy enough and stiff enough to be pushed positively across the die without buckling, or where there is no scrap for the second set of rolls to grip. If the single rolls are used on the left side, they can pull the material across the die, if the scrap left from blanking is strong enough to prevent its breaking.

Drive to the feed rolls can be obtained either by a rack meshed with a pinion fastened to one of the rolls, or by a pawl and ratchet. The operating lever is connected to a crank disk on the press crankshaft or to a slotted crank block. In either case by varying the crank throw it is possible to vary the feeding length. Usually there is some kind of cam release on the rolls to allow the pilot pins in the press tool to register the strip just before blanking. The cam in descending trips a lever which releases or separates the rolls. The relief lever is also used to separate the rolls when inserting a new strip. Use of the relief is advocated in all cases where pilot pins must register the strip from previously pierced holes.

Double-roll feeds are often set up with much accessory equipment, especially on high-speed straight-side presses. They are also useful, however, on gap-frame presses, as Fig. 20 shows. Here a double-rack and pinion roll feed is equipped with straightening rolls, a scrap cutter, an oiler for the stock, and an automatic centering reel.

In one installation, a double-roll feed was employed on a double-action cam press, in blanking and cupping cupro-nickel bullet jackets. This set-up also had a scrap winder on the left side of the press, making it possible for one man to tend several machines. The comparative output of the press in ten hours with and without roll feeds is given as 25,000 and 13,000, respectively; enough, practically, to save the expense of one press and one man. Roll feeds of this type can be used on any type of gap press, and can feed thin metal strips up to 500 ft. per min., or more. They can be purchased integral with the press or separately.

### Automatic Slide Feed

The feeding unit illustrated in Fig. 21 is mounted on an adjustable floor stand to suit the height of the press. It is suitable for feeding flat strips, round sections, or other shapes than flat. This unit will feed coiled stock to presses on exact centers regardless of commercial irregularities in the stock. Its great accuracy is based on the principle of a confined slide

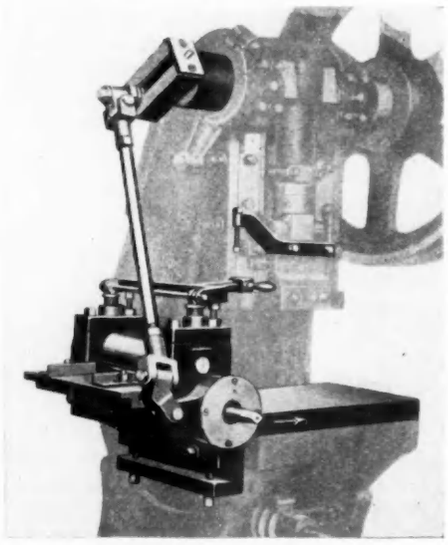


**Fig. 19—Strip is pushed from left to right by this single roll feed**

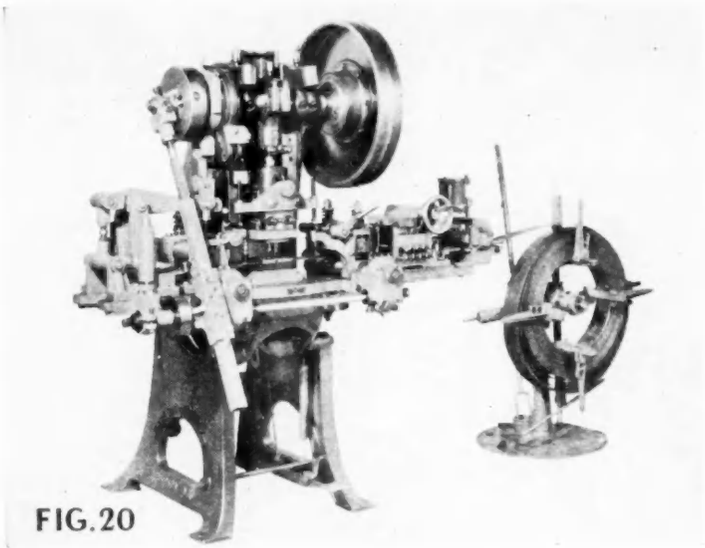


FIG. 20

FIG. 21

Fig. 20—Either coil stock or strip cut to length can be handled by this set-up, which is intended for the general stamping shop that has many different jobs to be run on one press. The accessory equipment includes a double rack and pinion roll feed, straightening rolls, scrap cutter, stock oiler and automatic centering reel

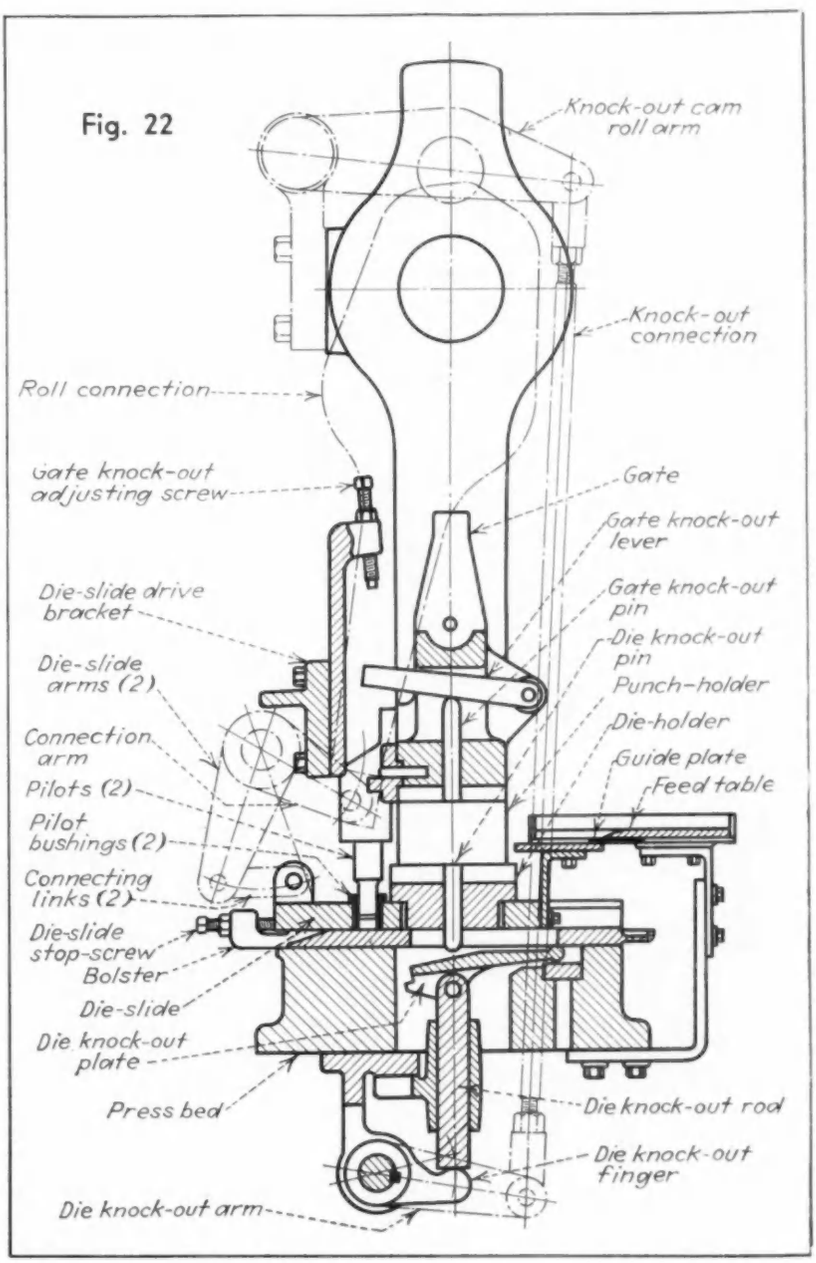
Fig. 21—A confined slide reciprocates between two positive stops and is responsible for the great feeding accuracy of the automatic slide feed

Fig. 22—A die-slide attachment slides the die into and out of the press automatically, and increases production over hand feeding

which reciprocates between two positive stops. The stock grip is mounted in the slide, and operates by the "jack-knife pinch" principle, which is constant. It is operated by an eccentric on the crankshaft, connected by an arm to the hole shown in the lug at the top of the view. There is a lever provided for opening the stock jaw to admit the end of a new coil. It has a brake that prevents "strip throw," and an adjustable "drag" that holds the advanced strip.

### Hitch Feeds

Another feeder is called a "hitch feed." It is designed for handling light-gage strips up to about 3 in. wide. It is attached on the right end of the die holder for right to left feeding; and 1½ in. is left open on the end of the die holder for attaching. It is operated by an angular lug secured on the punch holder. When the ram descends, the angle on the lug contacts a roller on the feeding slide, causing it to recede for the next throw. A "pinch check" against the strip holds the stock from slipping back while the "jack-knife" grip in front of the check takes hold. When



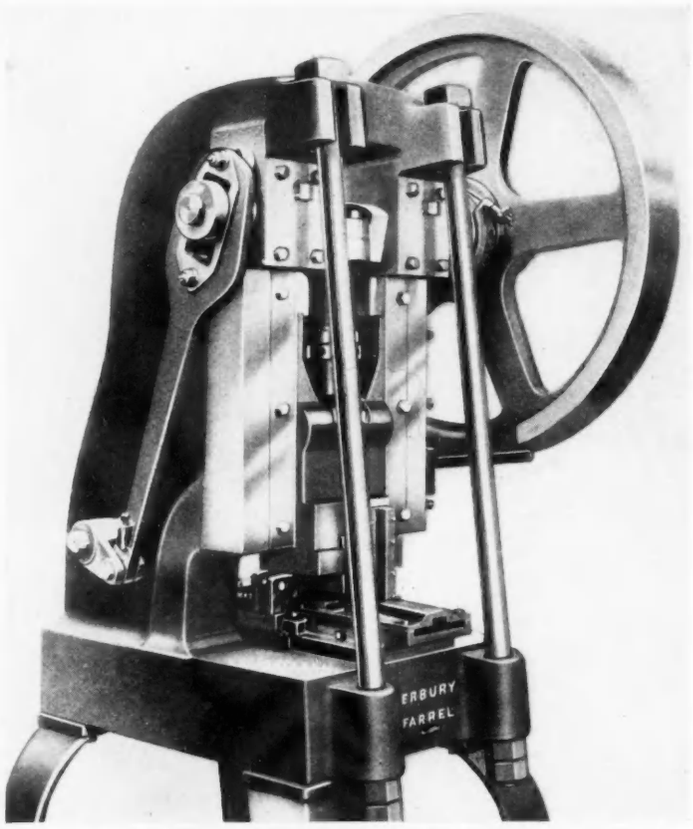



Fig. 23—Blanks fed into a magazine at the front are transferred by the slide of the transfer-slide attachment to the first-operation tools and then to the second operation

the ram ascends, a tension spring attached on the feeding unit pulls it forward with the strip, a distance equal to the blanking centers of the die. The angle and width of the lug is designed to suit each job, but this is a very simple layout.

### Die Slide Attachments

Although unfamiliar to many press users, such attachments have been in use for years. The attachment slides the die in and out of the press automatically, but in synchronization with the press stroke. It is primarily a safety device, and its use will sometimes increase production from 50 to 150 per cent, depending on the nature of the work. Another advantage is that the tools already in use on hand-fed presses can be attached with little or no alteration.

Tool setting is as simple as on a plain press, which makes this attachment suitable for small orders. Punches and dies are aligned by pilot pins which enter bushings in the die slide when the ram descends. A cross-section view, showing the working members of this attachment, and its principle of operation is given in Fig. 22. For work which has a tendency to remain in the die, die knockouts and ram knockouts are employed.

A horizontal sliding feed, Fig. 23, is operated by a compound linkage in the rear of the press. The linkage is attached to a horizontal rocker shaft, which extends between the press frames, and which has a bearing in each frame. The slide, linkage, and shaft are operated by a slotted connecting arm, with the slot attachment to an eccentric on the crankshaft. Stroke of the slide is adjustable.

Blanks are fed into a magazine shown at the front of the press, and are then transfered by the slide to the first-operation tools. The pieces are then held by two pair of spring carrier fingers in the slide, while being transferred to a second operation. The slide is also provided with "pull off fingers" that strip the finished work from the punches.

### Transferring Shells

Another feed is the horizontal progressive blade feed used on multiple drawing presses. These presses may have any number of rams within reason, five being the usual limit. In average practice, drawn cups are fed to a continuously revolving friction dial, from which a finger controls their entrance to the first die. Running the full length across the dies are two parallel horizontal bars having V-shaped notches on their inner edges at each die. When the ram descends, these bars are separated by the punches. As the punches ascend, the knock-outs bring the bottoms of the cups up level with the top of the dies. The two bars close together by spring action, and hold the shells in the V-notches, and then move forward one station. This operation is repeated at each stroke, with one shell feeding in and another leaving the press finished. The V-notches, of course, must fit the diameter of the cut at each station.

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## Couplings Influence Gear Operation

W. P. SCHMITTER AND E. L. DAVIS
*The Falk Corporation*

It is the mistaken opinion of some operators that so long as a coupling stands up in service, it is doing all that can be expected of it. That this is not true is well appreciated by all gear men. Faulty operation of gear units has frequently been found to originate in unsatisfactory shaft connections.

The main essentials of a satisfactory flexible coupling are that it:

A. Transmit power from the driving to the connected shaft under slight angular or lateral misalignment, without:

1. Setting up variations in the angular velocity of the transmitted motion;
2. Imposing undue loads on the bearings or shafts of the connected equipment;
3. Restraining the free independent axial motion of either connected shaft.

B. Operate over extended periods without:

1. Need for frequent replacement of the flexible members or wearing parts;
2. Need for frequent attention and lubrication;
3. Damage from encroachment of dust, water or oil.

C. Embody the following features:

1. A simple means for disconnection of the two shafts;
2. A construction inherently in balance;
3. A smooth exterior in order to avoid hazards to operators.

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From a paper presented before the 22nd annual meeting of the American Gear Manufacturers' Association.

# MADE FOR ANOTHER AGE

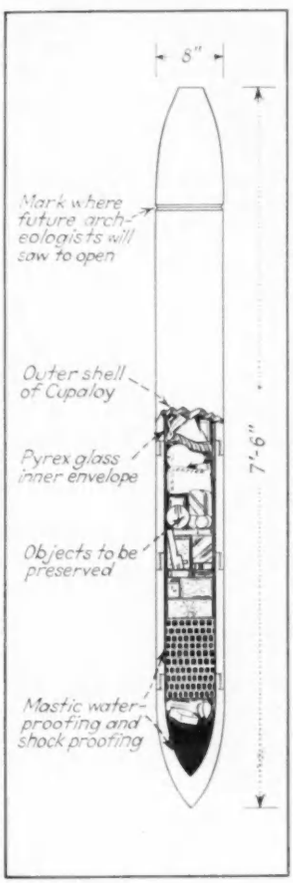
WITH THE intention of preserving for scientists of the 70th century tangible records of life in the 20th, Westinghouse engineers have constructed a massive shell believed able to withstand the ravages of 5,000 years. Made of Cupaloy, an alloy of copper, chromium and silver, the tube will contain several news reels, books reproduced on microfilm and many small articles considered representative of our present-day life.

Lined with shock proofing compound, the cylinder will contain a long tube of Pyrex glass, inside which will be placed the various articles to be preserved. Filled with an inert gas, the tube will be sealed with glass tape and asphalt compound; then the Cupaloy cap will be pulled up and shrunk onto the taper threads of the cylinder. The "time capsule," as the engineers have dubbed their creation, will be buried 50 ft. beneath the Westinghouse exhibit building at the 1939 New York World's Fair.

The age-old corrosion-resistant properties of copper are utilized in the Cupaloy shell, and the composition of the metal is such that it is the anode in electrolytic reactions with corrosion-producing salts in the soil. As the years wear on, it will therefore receive deposits instead of being eaten away.

Books describing the capsule will be distributed to libraries in the hope that enough copies will endure to guide archeologists to the cylinder.

Westinghouse engineers admire Pyrex glass lining and the Cupaloy outer shell of their "time capsule," a sectional view of which is shown below



The seven segments of the alloy cylinder were finish machined and polished as a unit. All sections except the end cap were later sealed with asphalt compound and the joints peened over and burnished

The internal bore of the end cap is checked prior to chasing the threads. Designed to resist corrosion for 5,000 years, the sections are made of a tough alloy of copper, chromium and silver, which can be hardened by heat-treatment

# IDEAS FROM PRACTICAL MEN

## No Spring in This Grinding Wheel Spindle

GREGORY THOMPSON

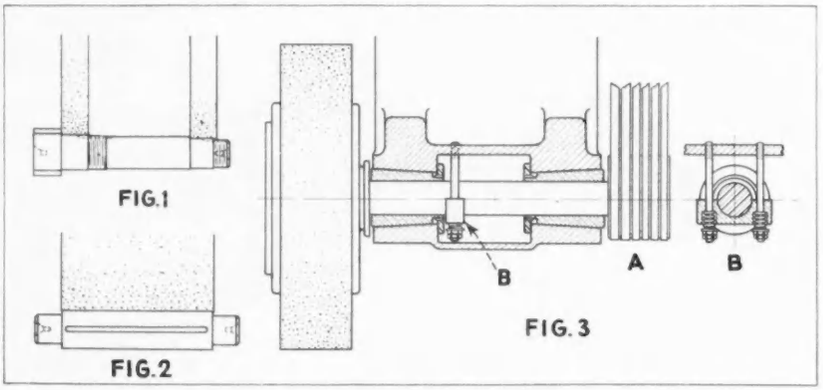
Recently we had an order for several hundred shafts of the types illustrated in Figs. 1 and 2, one grinding machine only being available for the job. The two diameters of the shaft shown in Fig. 1 were ground by a special arrangement of two wheels on a single mounting. The other shafts were ground by a wheel of the same width as the length to be ground. They had to be accurately straight because they were to be a close fit for sliding rollers.

Actually, a taper of 0.0004 in. resulted from the first cut, the large end of the taper being at the left, making it necessary to adjust the table which involved the possibility of having to scrap one or more shafts before the correct adjustment could be determined.

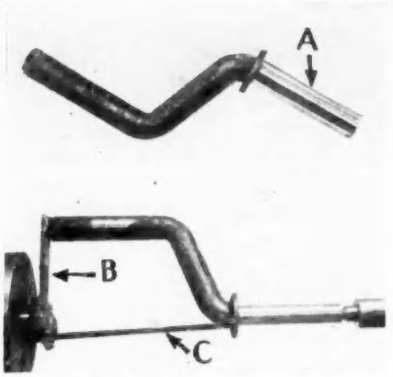
The wheel spindle was driven by a series of V-belts running over a pulley having multiple V-grooves, as shown at *A* in Fig. 2. A diagnosis of the trouble, which proved to be correct, indicated that the pull of the belts crowded one end of the spindle toward the back of its bearing, while the opposite end tended to press toward the front of the other bearing. Under such conditions it is apparent that in dressing the wheel, its face would be slightly conical, and that in actual grinding, the wheel pressure against the work would force the wheel backward until the back of the front bearing assumed the load. While the backward movement of the wheel might be 0.0001 in. only, the error in the work would be twice that amount.

A careful refitting of the spindle bearings resulted in making them run hotter than normal without eliminating the taper grinding. The final remedy was to apply the spring-backed half bearing *B* to the wheel spindle just behind the bearing at the wheel end. The result was that the spindle was held toward the backs of both bearings, insuring its correct axial alignment under all conditions, thus eliminating the necessity for adjusting the table to compensate for taper when changing the wheel set-up for one type of shaft to that of the other.

After application of the half bearing, another development was that in truing the wheels in the double wheel set-up, the wheel-feed stop could be adjusted the exact amount for truing the wheels for grinding the two diameters of the shaft in Fig. 1 to the correct size. Previously it was necessary to introduce an error to compensate for the sidewise deflecttion of the spindle. It was further disclosed that before applying the half bearing, the two diameters had actually been ground taper, but that due to their short lengths the taper had never been detected.




**Figs. 1 and 2—Both types of shafts were ground on the same machine, each requiring a different wheel set-up. Fig. 3—A spring-backed half bearing applied just behind the front bearing eliminated taper grinding**




**It was impossible to mount the crank-shaped piece on centers for turning the part *A* until the flat pieces of steel *B* and *C* were welded to it to provide means for locating the centers**

## Driving an Odd-Shaped Piece in the Lathe

EDWIN KILBURN

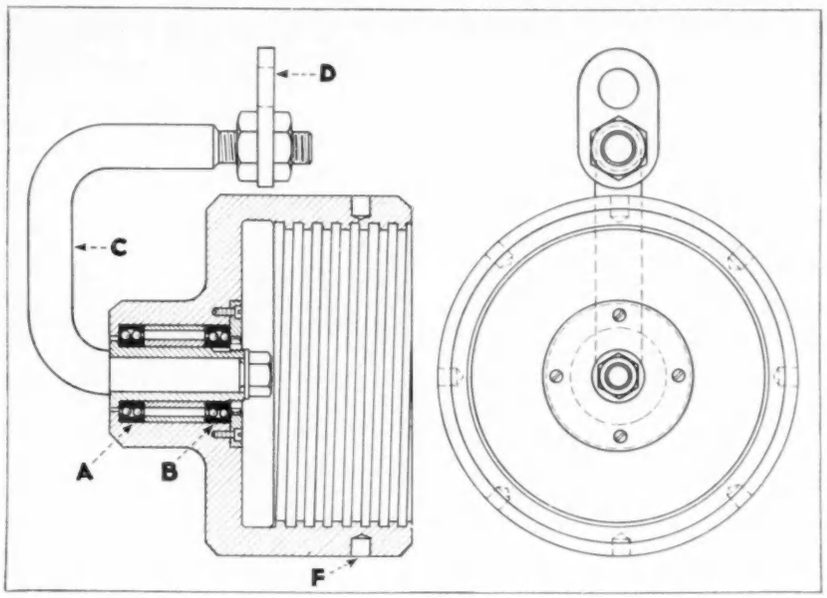
We recently had to turn the part *A* in the piece illustrated, but since there was no way for mounting it on centers we arc-welded the two pieces of flat steel *B* and *C* on it as shown. After locating, drilling and countersinking the centers we were able to do the work satisfactorily in a comparatively short time. Since the flat steel pieces were welded only lightly to the piece, it was but little trouble to remove them after the lathe work had been finished.

## Handling a Heavy Thread Gage

J. R. WHITTLES

In the illustration is shown how a thread gage 20½ in. in diameter and weighing nearly 500 lb., too large and too heavy to be handled in the usual way, was suspended from the shop crane in such a way that it was in balance and could be easily turned.

The gage was mounted on the ball bearings *A* and *B* on the horizontal lower leg of the U-shaped bar *C*, the horizontal upper leg of which is threaded and upon which is carried the flat link *D* between two nuts. The link has a hole to permit engagement of the crane hook and can be




A thread gage that was too large and too heavy to be handled in the usual way was suspended in balance from the shop crane

positioned by the nuts so that the gage will be suspended in balance.

Eight blind holes *F* in the periphery of the gage permit the use of a bar as a lever in turning the gage on the work.

## Guide for Drilling Holes at an Angle

H. MOORE
*Kirkstall, Leeds, England*

By the aid of the device illustrated it is possible to drill holes at acute angles in shafts and other cylindrical work.

The device consists of the hardened roller *A* in which there is a V-groove having a fillet at the bottom of the same radius as that of the drill used for starting the hole; the pin *B* on which the roller revolves; the yoke *C* carrying the roller and the pin; and a clamping screw.

In operation, with the work clamped at the desired angle and the device placed loosely in it, the starting drill is brought down to the center-punch mark that locates the position of the hole. The device is then adjusted and clamped so that the drill contacts the fillet at the bottom of the groove, which guides it and prevents it from running. The same sized drill is used to start the holes in all the pieces, making good center marks below the surface, after which it is an easy matter to drill the holes with a drill of the required size without the aid of the device.

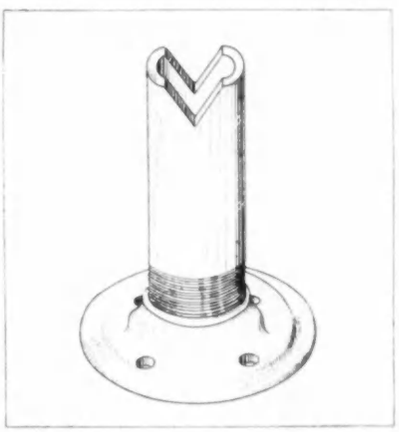
## Pipe V-Blocks

C. F. FITZ

Those who do considerable work on the drill press are certain to have a large quantity of cylindrical work to be drilled and often have to rig up V-blocks at various heights to suit the work.

That practice gave us considerable trouble until we made V-blocks like the one illustrated. Pieces of $1\frac{1}{2}$-in. pipe of various length have V's milled in one end, the opposite ends being screwed into floor flanges. Many combinations of nipples and couplings can be used to make them higher if necessary, and to adapt them for use in machines other than drill presses.

A feature in their favor is their cheapness, since most shops have odds and ends of pipe laying around that can be used in their making.

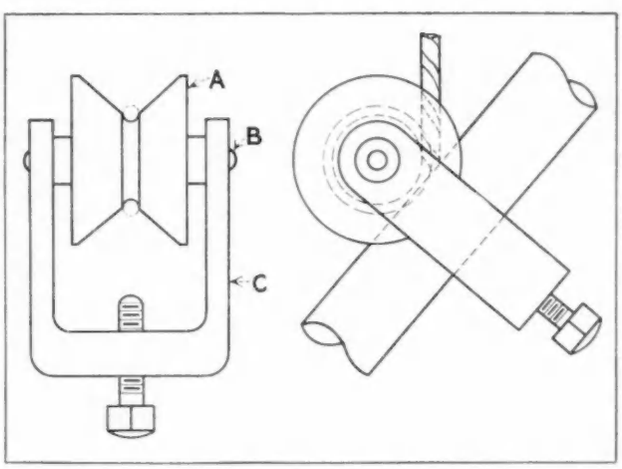


V-blocks of varying height to suit the work can be made by varying the length of the pipe or by a combination of nipples and couplings

## Spring Toolholder

PHILIP J. RAAB

In the spring toolholder illustrated the nose has a pipe thread and is slit in three places to form a chuck. The nut is tapped with a pipe tap so that when it is screwed tightly on the nose, the toolbit is held securely. The toolbit is round and has a flat on its top so that oil squirted on it through




The devise is adjusted and clamped on the work so that the drill contacts and is guided by the fillet in the bottom of the V-groove.

The toolbit is held securely by screwing the nut on the slitted nose of the holder. Both the nose and the nut have pipe threads.

the large round hole will reach the cutting point.

A hole is drilled lengthwise through the shank of the toolholder so that when it is used in the shaper the spout of an oil can can be inserted therein and the oil will drip through it and onto the cutting point of the toolbit.

I have used this toolholder for many years and have found it to give good results, especially on jobs requiring a formed tool.

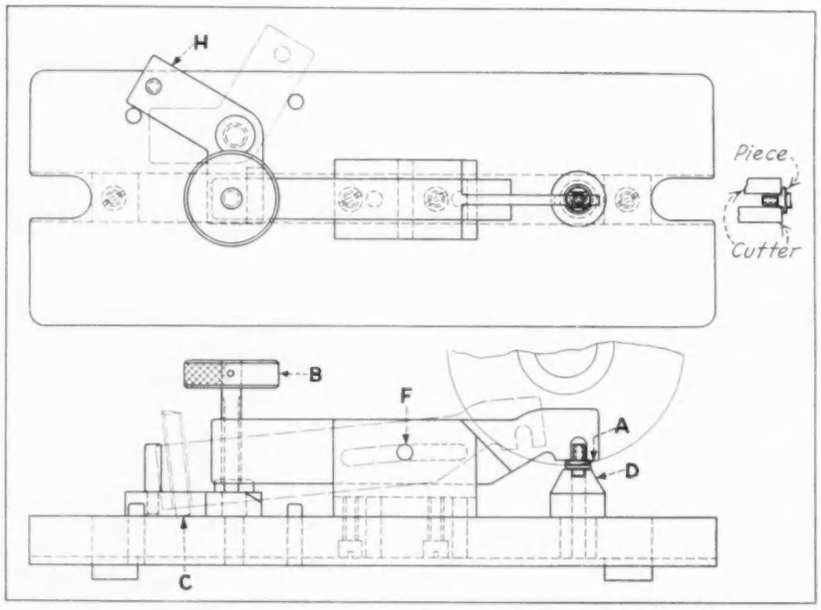
## Quick-Acting Milling Fixture

C. COLE

A fixture is shown for straddle milling part of the shoulder on the work indicated by heavy dotted lines. Since the work is of very soft brass and the upper part is threaded, it was necessary to clamp it by the shoulder.

In operation, with the clamp *A* pulled back and tilted so that the end of the clamping screw *B* rests on top of the fixture base at *C*, the work is placed in the nest *D*. After loading the fixture, the clamp is pushed forward until it is stopped by the end of the slot coming in contact with the pin *F*. The rear end of the clamp is then raised and the pivoted filler block *H* is swung under the end of the clamping screw. One turn or less of the clamping screw clamps the work firmly in the nest by the shoulder. To remove the finished work the operations are reversed.

If it were not for the pivoted filler block it would be necessary to turn the clamping screw several times.




The sliding clamp is pushed forward and is brought into clamping position by swinging a pivoted filler block under the end of the clamping screw

## Involute Spiral Gears

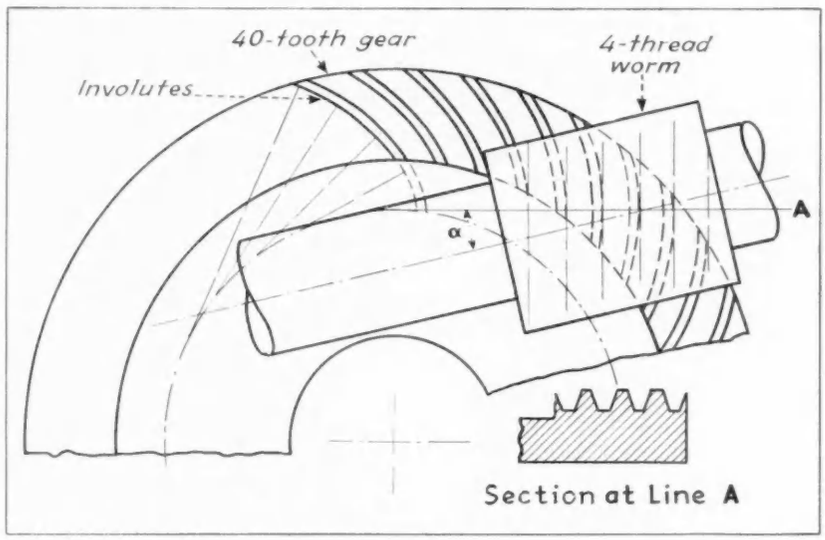
FRANCIS W. SHAW
*Gear Consultant*
*Whitworth Lancashire, England*

In many instances an easily generated worm-driven involute spiral gear can be substituted for skew bevel gears.

If a hob be set in relation to a gear blank in the manner illustrated, and sunk in gradually to the required tooth depth as the blank rotates with the hob according to the ratio of threads to teeth, it will generate teeth of the form indicated on every section at lines *A* tangent to the base circle *B*. The angle $\alpha$ corresponds to the thread angle of the worm, which need not, however, be that of the hob, the diameter and number of starts of which may differ from those of the worm within limits.

The base circle *B* must, of course, contain the normal pitch of the hob and of the engaging worm as many times as the gear has teeth. Thus, if the hob be of 8 diametrical pitch and 40 teeth are to be generated in the gear, the diameter of the base circle *B* would be $40/8 = 5$ in. The base circle should be well within the inner circle of the teeth or interference will occur at the inner ends of the teeth being cut.

It will be manifest that if the hob be a replica of the actual worm, the section cannot be but congugate. But,




The involute spiral gear is generated by a hob sunk in gradually to the tooth depth as it and the blank rotate in ratio of threads to teeth

provided the hob be set at its own thread angle to the tangent *A*, it will produce the same section at the lines *A*, and so the same conjugality must exist. Worms of different diameters must, for the same reason, engage correctly with the same gear. In gears of about 8 in. external diameter, generated by an 8-pitch standard 20-deg. hob, the section at *A* showed perfectly straight-sided rack teeth. If there really was an interference it was not discoverable by any ordinary means.

The gears were generated in a vertical hobbing machine in which the minimum cutting center distance was rather small. In some machines the hob would have to be projected forward a little. That can be done, and frequently has been done, by running the hob spindle in special brackets attached to the hob-spindle head. Blank and hob are rotated in the ratio of threads to teeth.

**AMERICAN MACHINIST** *Reference Book Sheet*

*Time-Data Sheet No. 9*

# Spray Painting Sheet Metal Parts—III

## APPLICATION:

This formula applies in Section F-1 to the spray painting of all sheet metal parts whose total area does not exceed 8,000 sq. in., using present equipment and under present conditions. Improved equipment now in use sprays a stripe 8-in. wide and has a paint tank of 5-gal. capacity, the paint being mixed by a pneumatically-driven paddle.

Present finish specifications call for a first coat of finish No. 2331029 and a second coat of lacquer, both being quick drying. This permits the operator to handle a part almost immediately after it has been sprayed, thereby eliminating congestion of parts in the paint booth. Time shown is for both the first and second coats of paint. Pieces having more than 3210 sq. in. area painted have been found by time study to be too heavy to be handled by hand and too large to be placed on the table in the spray booth. These are suspended from an electric hoist and painted in front of the paint hood.

**Table No. 2—Turn Piece Over on Paint Table**

| Area Painted Square Inches | Allowed Time Decimal Hours | Area Painted Square Inches | Allowed Time Decimal Hours |
|---|---|---|---|
| 0 to 100 | 0.00130 | 1601 to 1700 | 0.00216 |
| 101 to 200 | 0.00135 | 1701 to 1800 | 0.00221 |
| 201 to 300 | 0.00140 | 1801 to 1900 | 0.00227 |
| 301 to 400 | 0.00146 | 1901 to 2000 | 0.00233 |
| 401 to 500 | 0.00151 | 2001 to 2100 | 0.00239 |
| 501 to 600 | 0.00156 | 2101 to 2200 | 0.00244 |
| 601 to 700 | 0.00161 | 2201 to 2300 | 0.00250 |
| 701 to 800 | 0.00166 | 2301 to 2400 | 0.00255 |
| 801 to 900 | 0.00172 | 2401 to 2500 | 0.00260 |
| 901 to 1000 | 0.00177 | 2501 to 2600 | 0.00265 |
| 1001 to 1100 | 0.00182 | 2601 to 2700 | 0.00270 |
| 1101 to 1200 | 0.00187 | 2701 to 2800 | 0.00276 |
| 1201 to 1300 | 0.00193 | 2801 to 2900 | 0.00281 |
| 1301 to 1400 | 0.00200 | 2901 to 3000 | 0.00286 |
| 1401 to 1500 | 0.00206 | 3001 to 3100 | 0.00291 |
| 1501 to 1600 | 0.00211 | 3101 to 3210 | 0.00296 |

## ANALYSIS:

Tools and equipment needed are: hood, revolving table, angle iron rests, wrapping paper, electric hoist, spray gun and tank, waste and pliers.

Spray painting in Section F-1 is done with a pneumatically-operated paint spray gun having an adjustable nozzle for regulating the width of stripe painted. Material to be painted is placed by hand on a circular table, pivoted so it can be turned, or hung on an electric hoist in front of the spray hood.

The circular table is located in a hood into which a stream of air is driven by a motor-driven fan. This keeps the pain spray away from the operator. Air stream set up by the fan is sufficient to remove the spray even when parts are being painted in front of the hood.

Circular table is kept covered with heavy wrapping paper, eliminating any need for washing the table. This paper is removed and a clean piece put in place each time the paint tank is changed from the first to the second coat or vice versa. When a thick coat of paint accumulates on the angle-iron rests, it is scraped off with a knife.

Paint is purchased in 5-gal. cans and is thoroughly mixed before being used. Two 5-gal. buckets which fit into the paint tank are standard equipment. One of these buckets is used for the first coat paint, the second for the black lacquer second coat. Cover for the tank is equipped with air-driven paddles, which extent into the tank when the cover is in place, for mixing the paint and thinner. This cover also has a nozzle for attaching the base from the spray gun. Six screw clamps hold the cover in place on the tank.

When changing the paint buckets for the first or second coat, or when refilling the buckets, it is necessary to shut off the air, open the air vent on the cover to release the pressure, then release the screw clamps and lift off the cover. The bucket then can be lifted out of the tank and exchanged, or refilled (one-half with paint and one-half with thinner) up to about 2-in. of the top of the bucket and replaced in the tank. When the cover has been replaced, the air valve is opened to start the mixing paddles and furnish pressure to the gun. Paint remaining in the gun hose from the previous operation may be blown out quickly by letting the spray gun blow into the booth. By the time the other color of paint appears at the nozzle of the spray gun, the paint and thinner in the bucket will be mixed thoroughly and ready for use.

It usually is necessary to change the color of paint twice per day. Operator should arrange his work so he can spray with the first coat paint during the morning and with the second coat during the afternoon.

Material to be painted is brought to and stacked on the floor near the paint booth by material handlers. Oily material is put through a washer before delivery to the paint booth. Material on which white lead has been used must be wiped clean before washing, as the washer will not remove white lead.

**AMERICAN MACHINIST** *Reference Book Sheet*

*Time-Data Sheet No. 10*

# Spray Painting Sheet Metal Parts—IV

Setting of the adjustment needle in the spray gun nozzle for best results is determined by the operator's judgment; if the spray is too fine an excessive time will be required to cover the surface being painted. A very smooth paint surface is required and care must be taken that the adjustment is correct. Width of stripe always should be the maximum possible.

The sheet metal parts made and painted in this section ordinarily have plain surfaces, although there may be pieces of angle or strap iron riveted on for reinforcement and such items as hinges and latches may project past the edge of the piece. All projections are considered, when they add to the area being painted, in calculating the time value from the area painted. A piece of angle iron riveted in the corner of a box, or a flat piece of strap iron riveted across the cover of a box, is not considered unless it projects past the edge.

In order that time values may be entered on the time slips, it is essential that the operator list the drawing number, item number and number of pieces for each lot of parts painted. This information is to be taken from the identification tag, which must accompany each lot of parts to the paint booth.

## PROCEDURE:

Pick up piece and place on paint stand or raise piece to position with electric hoist, get spray gun from hook, spray part with paint, turn part over on paint table (where necessary), hang gun on hook, remove part from stand and place aside or lower to floor from electric hoist, open and close tank cover, refill paint tank or change from first to second coat, make out and turn in time slip.

## TABLE OF DETAIL OPERATIONS:

| *Symbol* | *Description of Operation* | *Time Allowed* |
|---|---|---|
| *A* | Pick up part and place on stand | Curve |
| *B* | Get spray gun from hook | 0.00072 hr. |
| *C* | Spray part with paint | Curve |
| *D* | Hang gun on hook | 0.00069 hr. |
| *E* | Remove part from stand and place aside | Curve |
| *F* | Turn part over on table | Curve |
| *G* | Raise part to position with hoist | Curve |
| *H* | Lower part to floor from hoist | Curve |
| *J* | Open and close door | 1 per cent |
| *K* | Clean equipment and change or refill tank | 3 per cent |
| *L* | Make out and turn in time slip | 0.0578 hr. |

## SYNTHESIS:

Constant, set up $= L = 0.0578$.

Constant, get gun from hook and return $= B + D + J + K = 0.00072 + 0.00069 + 1\% + 3\% = 1.04 \times 0.00141 = 0.00147$.

Table No. 1 shows time allowed for positioning part, painting it and then placing it aside. These values were obtained by adding together curves which were plotted separately for operations *A*, *C*, *E*, *G* and *H*. Values then were read from the composite curve and tabulated. All curves were determined by time study.

Table No. 2 is a tabulation of readings from a curve determined by time study for operation *F*, turn part over on table. Some pieces, such as controller covers, can be set on edge and all of the surface painted by turning the revolving table, without having to turn the piece over. These values apply only where the piece is of such nature that it must be turned over. Only pieces up to 3210 sq. in. area are covered by this table, as larger pieces are suspended from the hoist and can be painted all over without the necessity of being turned over.

No additional time is allowed in any of the above values for turning the revolving table, or raising and lowering the hoist, while the piece is being painted, as these operations are performed with one hand while the spray gun is operated with the other. In addition to standard allowances, four per cent has been added to all values, except that for operation *L*, to allow time for operations *J* and *K*.

## INSPECTION:

All parts must be covered with two coats of paint.

## PAYMENT:

Standard time group wage payment plan.

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### Thread Grinding Undercut Studs—*Correction*

The tolerance to which threads are finish-ground in hardened, undercut studs by Wright Aeronautical Corporation, Paterson, N. J., is 0.001-in. for errors in form, lead and taper per inch; not 0.00002-in. as previously given (*AM*—Vol. 82, page 693). Rough grinding operation leaves approximately 0.007-in. stock on the thread surfaces, this being removed in the finish-grinding cycle.

# NEWS OF THE INDUSTRY

## Agricultural Machinery Outlook Good Despite Lower Farm Prices

**Manufacturers attribute long-term outlook to low-priced units and increased cost of farm labor**

**RAYMOND R. WIESE**

CHICAGO—If the American farmer spends the same percentage of his income on agricultural machinery this year as he did last, sales in this industry will be about equal to those of 1936. This prediction is based on recent estimates that the farmer's 1938 gross income will be in the neighborhood of $7,500,000,000 and on that fact that last year's sales of agricultural machinery totalled $507,000,000, or 5.9 per cent of the farmer's gross income.

Prospects for the fall season are clouded by present low prices of grain and by the situation in cotton and in the citrus and other fruit industries. However, it is highly probable that the upswing in general business will be reflected by an improvement in farm sentiment which should give equal, if not better, business for 1939.

This is supported by the fact that after a lapse of several months agricultural implement manufacturers have again placed cautious orders for steel. It will be remembered that during the first half of 1938 this industry was one of the main supporters of the steel business. Tractor and implement plants were humming along pretty well while other businesses were in the doldrums. This activity later backfired because it resulted in the building up of inventories which could not be moved. When the sudden slump in farm prices came in the middle of the summer agricultural buying suddenly took a nose-dive. International Harvester had to close some of its reopened plants last month because of lack of orders. J. I. Case was forced to lay off additional men in the past weeks and other manufacturers have been similarly affected during the course of the last few months.

It is difficult to draw any definite conclusion as to the present status of the industry because of the varying seasonal trends of the many different types of agricultural machinery. However, the accompanying table shows what the estimated results of this year will be based on the experienced of previous years back to 1929. This indicates that total sales for the year may be off fifteen per cent. However, the situation is spotty because some companies have enjoyed better while others have had less business this year than in previous years. Some, such as Allis-Chalmers with its small $500 tractor, have brought out a new product which has opened up new sales fields and no comparison can be made with previous years.

Regarding the outlook for next year it does not seem that the recent drop in farm prices is necessarily disastrous from the profit standpoint because there is a saying in the corn belt that "a farmer can always make money if he can feed 50-cent corn to 9-cent hogs." That is the situation today. Cheap grains are being fed to stock which is still selling at a price to make it profitable.

It is probable that grain and livestock prices will not drop below present levels and may go higher under the impetus of war scares which means that farmers will have even more purchasing power for next year. If low prices continue, more intensive

### LATE *NEWS* WIRES

**CINCINNATI—Crosley Radio Corp. will vote Sept. 23 on proposal to drop "Radio" from company's title. Action believed taken because of plan to enter automobile field with baby car.**

**CHICAGO—Illinois Central has ordered 1000 cars for delivery early next year by American Car & Foundry Co. at St. Louis. They will be acquired under rental arrangement which will amortize cost in 15 years.**

**BOSTON—A leading textile machinery maker has gone back on five-day week, 2000 employees benefiting. Prominent electrical goods maker reports largest week's sales this year.**

**DETROIT—Close to 50,000 men have been rehired by automotive companies and parts makers in this city and in Flint, Pontiac, Saginaw, Bay City, Lansing and Muskegon, according to estimates made by *American Machinist*.**

**NEWCASTLE, IND.—The U.A.W. has called a strike which has tied up the local plant of Chrysler Corp.**

**DETROIT—Pontiac is dipping deeper into low-price field with a second six in keeping with trend toward lower prices. Briggs strike settled by company taking back even the trouble-makers and reducing production to rate before the controversy.**

**WASHINGTON—If war should come now and end soon it is expected to have little effect on the exports of the metal-working industry. However, if the threat of war drags along it will greatly increase the demand for munitions, especially aircraft.**

**WASHINGTON—The Walsh-Healey board's iron and steel wage recommendation which is expected in a few days may put rates on a regional rather than a plant-size basis.**

| Year | Farm Income | Per Cent Spent for Machinery |
|---|---|---|
| 1929 | $10,470,000,000 | 4.9 |
| 1930 | 8,451,000,000 | 5.5 |
| 1931 | 5,899,000,000 | 3.6 |
| 1932 | 4,328,000,000 | 2.5 |
| 1933 | 5,117,000,000 | 2.6 |
| 1934 | 6,348,000,000 | 3.0 |
| 1935 | 7,090,000,000 | 4.7 |
| 1936 | 7,944,000,000 | 5.2 |
| 1937 | 8,600,000,000 | 5.9 |
| 1938 | 7,500,000,000* | 5.0* |

* Estimated

cultivation will be practiced to keep up gross income. Already a new type of corn is coming into use which increases yield by 25 per cent or more. Yield of other products per acre is being increased by improved practices and methods which in turn require more machinery.

The rate of expenditures for farm equipment has been greater in the past three years than at any other time. This is attributed to: the need of replacements after 1932–34; the opening of new markets with low priced tractors and implements; general improvement in business; and lack of labor at prices which the farmer could pay.

Low prices for his products plus the necessity for getting his work done with less help have made it necessary for the farmer to have larger plows and other cultivating equipment, tractors, combines and corn pickers. Massey-Harris recently reported that one of the biggest factors in the improvement of their sales over last year was their new low priced combine.

Tractor companies have in the past year spent millions of dollars on plant changes and additions. In addition to the amount spent on its new tractor works Allis-Chalmers plans to spend about $800,000 at its Laporte plant for production of a new small combine. It is expected that 200 to 300 men will be added to the payroll when the plant is completed in December. Plans call for the manufacture of 10,000 units for the first year.

For these reasons it is difficult to see why anything but an improvement in sales can be expecter for next year, particularly since general business sentiment is improving which will inturn improve the long term outlook for the farmer. The table indicates how quickly the investment in machinery increases when sentiment improves and the long term outlook is better.

Export business has been good in the past year. In 1937 some $75,000,000 worth of farm equipment was exported and export sales were holding up pretty well until recently. Unsettled foreign conditions make the export outlook uncertain although it is difficult to see how our major implement customers, Canada, Australia, Argentina, Great Britain and South Africa, will be adversely affected.

## Private Companies Get Ordnance Orders

WASHINGTON—Private industry was brought into the ordnance phase of national defense when the War Department awarded contracts totaling $7,282,455 to seventeen manufacturers. Included were four contracts for over $1,000,000 each.

Announced by Louis Johnson, acting secretary of war, the contracts are as follows:

York Safe & Lock Co., York, Pa.—Mounts for anti-aircraft guns, $1,557,330.

Eclipse Machine Co., Elmira, N. Y.—Mechanical time fuses, $1,027,000.

Keuffel & Esser, Hoboken, N. J.—Height finders, $1,108,800.

Bausch & Lomb, Rochester, N. Y.—Height finders, $239,400; observation instruments, $298,705.

Sperry Co., Broklyn, N. Y.—Directors, $1,892,800.

Read Machinery Co., York, Pa.—Smokeless powder mixers, $98,890; macerating machines, $34,420.

Struthers-Wells-Titusville Corp., Warren, Pa.—Amatol mixers, $3,954.

Sprout, Waldron & Co. Muncy, Pa.—Ammonium nitrate screening machines, $4,210.

Canister Co., Phillipsburg, N. J.—Assembly and criming machines, $9,482; detonator presses, $4,455.

Harding Co., York, Pa.—Ammonium nitrate rotary driers, $6,990.

F. J. Stokes Machine Co., Philadelphia, Pa.—Pelleting presses, $25,690.

Buffalo Forge Co., Buffalo, N. Y.—T.N.T. drilling machines, $4,575.

Shartle Bros. Machine Co., Middletown, O.—Jordan engines, $107,670.

McKiernan, Terry Corp., New York, N. Y.—Cutting machines, type A and B, $64,500.

Baldwin Southworth Co., East Eddystone, Pa.—Type A dehydrating smokeless powder presses, 208,800.

A. B. Farquhar Co., York, Pa.—Smokeless powder presses. Vertical finishing, $203,568; blocking, $140,800; macaroni and finishing, type B, $161,216.

Watson, Stillman Co., Roselle, N. J.—Smokeless powder presses; macaroni and finishing, $79,200.

## U. S. Government Contracts Awarded to Metal-Working Firms

(Awarded from Sept. 2—Sept. 8 inclusive)

| Contractor | Government Agency | Commodity | Amount |
|---|---|---|---|
| L. Norris Hall, Inc., Phila., Pa. | Navy, S & A | Cable | $29,505 |
| Allis-Chalmers Mfg. Co., Milwaukee, Wisc. | Interior | Tractors | 17,839 |
| Lloyd & Arms, Inc., Phila., Pa. | Navy, S & A | Engine lathes | 18,394 |
| Universal Stamping Machine, Co., Stamford, Conn. | Post Office | Canceling machines | 22,860 |
| Ruth Dredger Mfg. Corp., Ltd., Los Angeles, Calif. | Interior | Dredging machine | 17,995 |
| Ruth Dredger Mfg. Corp., Ltd., Los Angeles, Calif. | Interior | Excavating machine | 17,995 |
| York Ice Machinery Corp., Phila., Pa. | Navy, S & A | Refrigerating plants | 14,759 |
| Nash-Kelvinator Corp., Washington, D. C. | Treas., Proc | Elec. refrigerators | 149,806 |
| The Browning Crane & Shovel Co., Cleveland, Ohio | Navy, S & A | Crane | 18,965 |
| The Ellis Drier Co., Chicago, Ill. | Navy, S & A | Laundry machines | 22,925 |
| National Forge & Ordnance Co., Washington, D. C. | Norfolk Navy Yard | Plungers & cylinders | 38,535 |
| Yellow Truck & Coach Mfg. Co., (General Motors Truck & Coach Div.), Pontiac, Mich. | Marine Corps | Trucks | 25,924 |

## Several Ohio Firms Increase Operations

CLEVELAND—Fisher Body recalled 1,000 men last week, bringing the total number at work to 3,000, according to an announcement by Lincoln R. Scafe, manager. Fisher's step-up in production will undoubtedly be followed by further employment in the city's automobile parts plants. At least 400 men will be rehired by Thompson Products, Inc., before the middle of October, according to statements released by Frederick G. Crawford, president.

In the Toledo area, employment is on the increase. Chevrolet recalled several hundred men to work Sept. 12. Electric Auto-Lite now has more than 2,000 at work.

# DETROIT LETTER

**Car announcements advanced to aid dealers and last-quarter profits . . . Tooling programs held mainly to extensive body changes . . . UAW fracas may mean three unions to badger automotive concerns . . . New cars appeal to the public's love of luxury**

DETROIT—Reasons for early announcements of new cars are: (1) to sell cars over a longer fall season while business is on the upgrade, (2) to give dealers something to sell, now that they are cleaned out, and (3) to establish a backlog that will offset interruptions by possible labor trouble after the elections.

Plymouth is already on display, and several others will announce new models around the end of the month. By October 15 the public will have a chance to appraise practically the entire field.

Clean-ups of new and used cars in dealers stocks have put the automotive industry in the best position in years to commence a new season. General Motors was short 75,000 new cars among its various divisions on September 1, because of the unexpected late summer pickup. Pontiac dealers had only half as many used cars on hand as a year ago. Such conditions are typical.

Production for the last quarter is conservatively estimated at 750,000 units. This should give a total for 1938 of 2,325,000 cars and trucks. Manufacturers are calling back thousands of men on a four- and five-day basis in Detroit, Flint, Saginaw, Pontiac, Cleveland, Toledo and other centers.

Expenditures for retooling have been limited mainly to dies, tools and fixtures, principally for body changes. Chrysler Corporation announced that its 1939 program cost $15,000,000. Fisher Body is understood to have spent large sums on dies. Suppliers of machine tools and presses have not shared greatly in these programs, their business being off about 70 per cent from last year. They are hopeful, however, that 1940 tooling program, which should get under way by the end of the year, will produce more orders.

Automotive leaders, such as W. S. Knudsen and R. H. Grant have forecast a sales increase of 25 to 35 per cent for 1939. Whether this increase will be obtained depends in some measure on the attitude of labor. Homer Martin is not likely to capitulate to the CIO, and he may find it necessary to form an independent union from loyal UAW elements. Almost half of the membership is backing his expelled lieutenants and the CIO, and is ripe to be grabbed by John L. Lewis. Since the AFL is somewhat more active in the automotive field, there is a strong possibility that car manufacturers will be confronted with three unions, all claiming jurisdiction and bargaining rights.

### Price Cuts in Order

Reductions of as much as $15 have been made on some models by Plymouth, which is the first to make prices public. Other manufacturers are considering or have already decided to make larger reductions. This is being done to attract larger sales volume, which is expected to compensate for higher costs of labor, longer wheelbase and luxurious appointments.

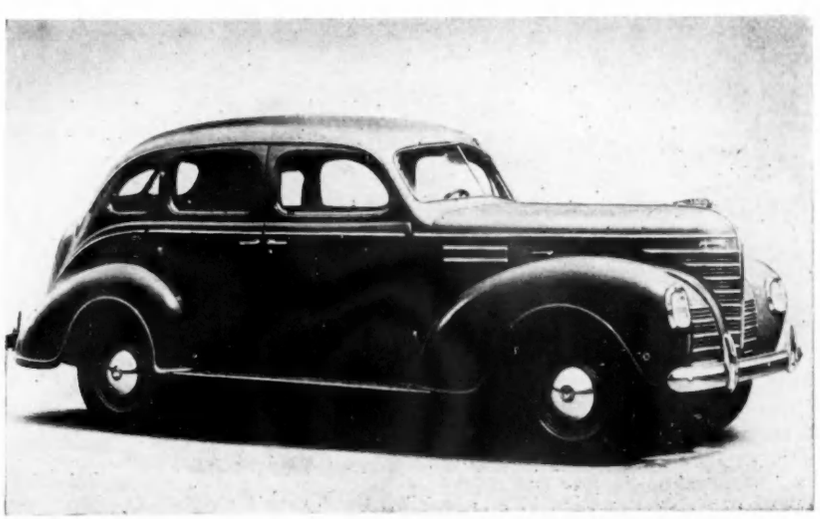
Most body styles will reveal the Lincoln-Zephyr trend, so far as the front end is concerned, but not entirely so with respect to head lights. One car of a given make may have bullet-type head lamps nested down in the partial catwalk, and others in the same line will use the Zephyr type mounting and have no catwalk. Back of the hood, the car will most probably resemble the Cadillac Special 60, which has no running boards.

Car exteriors will have more flowing lines and more decoration. Bright belt lines of stainless steel or chromium plate will add to the illusion of length, make the design appear more homogeneous. Most General Motors cars will use stainless steel belt lines, but Chevrolet is understood to be striking a more restrained decorative note. Ford is said to be planning almost as much decorative stainless steel in belt lines and radiator details on the standard model as on the deluxe. The poundage of stainless per car, as used by Ford, will be as great as at any time since 1931.

Car interiors have been planned to win feminine approval. Color, used lavishly in the appointments, better tailoring of the upholstery, wider and more comfortable seats, better vision, and easier control indicate the thinking of automotive designers and salesmen toward securing greater public acceptance.

More plastics are being used. One model has 39 pieces of colored cellulose-acetate in sight. Application of so much color might be considered garish, but the designers have been assisted by interior decorators and style experts so that good taste prevails.

Molded parts will not be much



*First to Announce New Models*—Including among its refinements a remote-control gearshift lever and a "safety-signal" speedometer, the 1939 Plymouth also has a 2-in. longer wheelbase.

larger this year. Lack of experience in molding the parts for a composite instrument board, for example, has caused plans in this direction to be laid over until the 1940 models. But 1939 models show a distinct gain in the application of cellulose-acetate molded plastics where color is important in car interiors, while the thermo-setting and phenolic compounds are being used as much as formerly for hidden applications where their drab color is not important and their other properties are necessary.

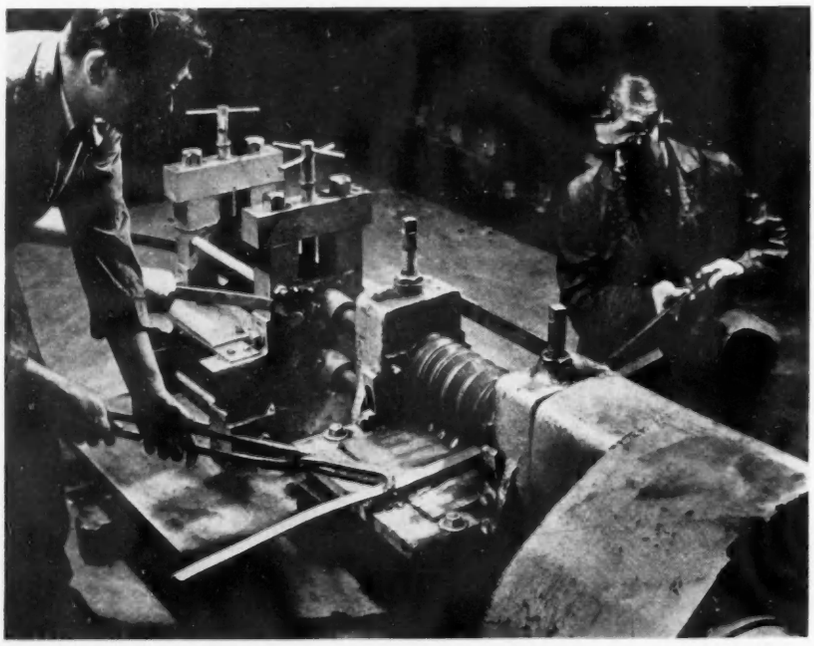
Since Plymouth is the first to announce, it is possible to give details with certainty. All models have a longer 114-in. wheelbase. Chief innovations are independent coil-spring suspension for the front wheels, "true steady" steering that eliminates the drag link by a center connection, a remote control gear shift on deluxe models, synthetic enamel finish, squarish headlamp lenses set into the massive fenders. The instrument board is larger and has a rounded top panel to fit the new V windshield. There is provision for a row of automatic station-selector buttons for the radio. This is one of the numerous safety features of the new models, permitting the operator to find a program without diverting his attention from the road. A safety signal speedometer flashes warning lights of different colors at various speeds.

Since remote control gear shift is standard on deluxe Plymouths, it can be assumed that it will be standard on Dodge and Chrysler lines. DeSoto has already announced it. It is likely that Dodge will also have the coil-spring suspension. Bright colors, new refinements in interior trim, greater passenger and baggage space and more comfort will be featured in all Chrysler-made cars.

Assembly of 1939 Pontiacs reached 40-50 per day last week, and 4,600 men were on the payroll. One of major mechanical improvements is "Duflex" springing which achieves practically the same rate of spring oscillation at the rear as at the front. Furthermore the rate is reduced to 72 per minute under full load and 76 under no load. This means that the shock absorbers can be adjusted more finely because of the restricted range. Pontiac will provide a mechanical remote control gearshift as standard equipment. Toward the end of 1938 production, practically all new car orders specified this feature.

New Cadillacs and LaSalles went into assembly last week. The 1938 production totaled 25,000 units, a drop of only 46 per cent from the previous year, and a better showing than the industry average. The Cadillac 60 Special with no running boards and the Cadillac 16 were successful models.

Should Ford decide to bring out a larger model, it will have a stepped-up 85-HP. V-Eight engine and wheelbase of 116 in. The car would be designed to appeal to the $1,000-car buyer who wants a V-engined car with some of the luxury and additional advantages of the Lincoln-Zephyr as against the present Ford. The present transmission and rear end of the Ford V-Eight are known to be amply strong for the power increase.



***Metallurgists Get Miniature Mill***—**Complete with cupola, furnaces, soaking pit and rolling mills, the new pilot plant of the Jones & Laughlin Steel Corp. includes this small two-high mill capable of reducing a 1¼-in. square bar to ½-in.**

## First Pilot Steel Mill Put Into Operation

PITTSBURGH—Through the use of a miniature steel mill, the first of its kind in the industry, a unique approach is being made to research in the new laboratory of the Jones & Laughlin Steel Corp. plant here.

In this recently completed research and development laboratory, steel making facilities such as an open hearth furnace, heat-treating furnaces and rolling mills of pilot size are used in conjunction with extensively equipped chemical, physical and metallographic laboratories in a direct approach to solving the problems of steel quality. This pilot plant of small manufacturing units will be used to investigate, with complete technical control, the various methods of steel making on a basis that permits ready application of new and improved practices to the big furnaces and mills of the production departments.

One of the principal features of this mill is the specially developed open hearth furnace having a capacity of 1,500 pounds. It is a recuperative rather than a regenerative furnace, and is equipped with an unusual burner, a type of construction which may be applicable to big furnaces used in actual production.

Ingots cast from this furnace weigh from 200 to 900 lb. and are usually rolled in the pilot plant. Two small rolling mills are used, one for primary reduction of the ingots and the other for further reduction for obtaining convenient laboratory specimens. Accessory equipment consists of a small combustion furnace for billet heating, a small soaking pit, a heat-treating furnace, a 500-lb. steam hammer and welding equipment.

In addition to the open hearth furnace, steel making facilities include a 375-lb. electric arc furnace used for experiments on slags and a 30-lb. induction furnace which affords the most exacting control over experimental steel making. A cupola is available to supply molten iron to a small bessemer converter to be constructed later.

# WATCHING WASHINGTON

**Textile committee being appointed . . . Metal-working representatives hope for change in definition of iron and steel industry . . . Army gets appropriation for planes and defense . . . Maritime Commission to order more ships . . . British still quibble over treaty**

**McGRAW-HILL WASHINGTON BUREAU**
(*Paul Wooton, Chief*)

WASHINGTON—Wage-hour Administrator Elmer F. Andrews, on Sept. 13, issued Administrative Order No. 1, appointing Industrial Committee No. 1, for textiles, and defining the industry. Machinery and metals men observed with satisfaction that the Administrator's every move is preceded by deliberate discussion with all concerned and that the committee appointments are A No. 1 so far. Not more than a half-dozen industries will be called upon to set wages above the 25-cent minimum within a year from October 24, effective date of the law. Metal-working's call is still considered a long time ahead.

The 44-hour and 25-cent provisions of the law of course affect everybody in interstate commerce. All in doubt whether they are in interstate commerce or not should comply. This question cannot be answered now, as the government has no definition or policy. It will be decided by the courts as employers challenge the constitutionality of the act. If the court should eventually decide that a group which thought it was out and did not comply was actually in, retroactive wages might possibly be ordered. Mr. Andrews says he would testify for any employer thus caught through a mistaken opinion of his administration, but that wouldn't help much.

Washington hears that the 44-hour wage provision will be a hardship on some isolated machinery plants that work long hours at straight rates when they have a hurry order. The men are not unionized and do not object. Plant owners say they cannot pay time-and-a-half. The government's intention is that employers hire more men. But in outlying places it's hard to get good men on a temporary basis.

So that companies making forgings or castings going into their own finished products will not have to work under two minimum wage rates, representatives of the metal-working industry are trying to persuade the Walsh-Healey public contracts board to change its definition of the iron and steel industry. They want (1) a qualifying clause to the effect that there shall not be included in that industry, blast furnace operations carried on as part of the processes of production of the products included with another industry; (2) that there shall not be included in the iron and steel industry, open hearth and electric furnaces for conversion of pig iron and scrap into steel when carried on by employers within another industry as part of the production processes of the products of such other industry.

### C.I.O. Loses Face

**Now that the primaries are practically over, legislators are impressed with the utter futility of the CIO as a political power. The American Federation of Labor lost only one spectacular fight—that against Tydings when the local autonomy issue cropped up so strongly. So AFL counsel will be heeded this winter, while CIO can go whistle for all its threats on Capitol Hill.**

**It looks as though Cordell Hull, who never has lost a fight, may be forced to join the anti-CIO ranks, especially in the fight on the Labor Relations Board. Edwin Smith, board member, sounded off in praise of the oil expropriation in Mexico, and John L. Lewis joined him. Both left the Latin delegates impressed that Roosevelt approved the seizure.**

**Wage-hour administration, and possible amendment, will be affected sharply by the surprising demonstration of local self-government sentiment. In politics legislators are always impressed by whatever they may consider to have been the paramount issue in any given primary or election. It is the jugdment of most political leaders in Washington that the "invasion" of Maryland and Georgia by President Roosevelt resulted in a reaction against "outside interference" which helped Tydings and George. Political reporters encountered this resentment all over both states.**

Secretary of War Harry W. Woodring said at Los Angeles Sept. 19 that about $33,000,000 will be spent this fiscal year for Army aircraft to reach the goal of 2320 within a year or so. He said over $20,000,000 is appropriated or authorized for anti-aircraft guns, machine guns, fire-control instruments, searchlights, etc., for fiscal 1939. This expenditure will result in complete equipment of existing 15 anti-aircraft artillery regiments. War Department has awarded contracts for 333 new rapid fire anti-aircraft guns and carriages, total cost $10,000,000.

### Friction in Commission

Again the Maritime Commission calls for bids on a batch of ships for government account. If prices are "in line," up to twelve of the new C3 design, faster and larger than C2, will be ordered. Participation of private shipping concerns in the Commissions's construction subsidy program seems at a standstill just now, but several firms are getting ready to enter building contracts with the Commission before December 31 to avoid refunding 25 per cent of their operating subsidies as required by law. Mississippi Shipping Company, Gulf—East South America, for one, will build a couple of ships. The Commission's internal affairs are not running smoothly, what with constant 2-5 split votes on important issues, and the probability that defeated Senator McAdoo or some other westerner will be appointed to replace Commissioner Max Truitt, whose term expires September 26. It is believed the Coast will keep the agitation for subsidies for domestic shipping, which is incompatible with the whole philosophy of the merchant marine program. Four Great Lakes states are filing complaints with the Commission that the North Atlantic Shipping Conference is a monopoly by reason of agreements prejudicial to Great Lakes commerce with Europe. The Lake states propose construction of a fleet of eight transatlantic "clipper" vessels.

### Trade Agreement Drags

How long is an argument? That telescopic yardstick is all Washington has to measure time until the British-American trade agreement will be completed. European situation puts a new color on wheat which is now in the negotiations, and it also should move the English to cut short their quibbling in an effort to strengthen their position by concluding this treaty. On the other hand, if Britain goes to war, we will give them anything they want, treaty or no treaty.

## Arc Welding Contest Winners Announced

CLEVELAND — $200,000 was awarded Sept. 15 to a total of 382 prizewinners in the James F. Lincoln Arc Welding Foundation contest, according to an announcement by A. F. Davis, foundation secretary. Authors of machinery papers received a large share of the prize money.

The grand award of the program went to Mr. and Mrs. A. E. Gibson, president and stockholder, respectively, of the Wellman Engineering Co. of Cleveland. The authors jointly received $13,941.33 for a paper consisting of a treatise on the elements required to assure success to users of welding throughout industry.

The largest award for a paper from the machinery field was received by Robert E. Kinkead, consulting engineer for the Carnegie-Illinois Steel Corp. at Cleveland. Mr. Kinkead's award of $8,852.94, third grand award of the entire program, was merited by his paper discussing clad metals as applied to the steel industry, in which he pointed out approximately $10,000,000 could be saved by arc welding.

Second largest award for a machinery paper went to John Mikulak, mechanical engineer with the Electric Machinery Mfg. Co. of Minneapolis, who received $3,764.94 for a paper showing the advantages of arc welded construction in electrical apparatus.

J. O. Bishop, welding supervisor of the National Supply Co. of Torrence, Cal., received $2,747.39 for his article. Altogether, authors of 165 papers in the machinery classifications received awards totaling $62,222.82. The amounts ranged from $101.75 to $13,941.33.

The foundation's award program, which began eighteen months ago, was judged by 31 engineering authorities from leading universities and colleges throughout the country. Tabulations computed by the organization show that the savings to industry by arc welding claimed by the authors aggregate over a billion dollars, even after discounting some over-enthusiastic statements. The committee is of the opinion that this amount would have been even greater had all the writers estimated gross savings from the application of welding to their products.

J. MIKULAK

R. E. KINKEAD

J. O. BISHOP

*Winners Watch Welding* — Mr. and Mrs. A. E. Gibson, winners of the first prize of $13,941.33 in the James F. Lincoln Arc Welding Foundation program, intently watch the process they discussed so successfully

## American Welding Society To Meet in Detroit

DETROIT—Plans are being rushed to completion for the nineteenth annual meeting of the American Welding Society to be held here the week beginning Oct. 16. With headquarters at the Book-Cadillac Hotel, the meeting and exposition will be presided over by P. G. Lang, Jr., society president.

The meeting will open with the president's reception on Sunday, will feature several simultaneous technical sessions for those of divergent interests, and toward the latter part of the week will include trips through the plants of the Ford Motor Co., the Cadillac Motor Co. and the Chrysler Corp. Papers scheduled for presentation before the technical sessions are as follows:

MONDAY, OCTOBER 17

The Oxyacetylene Welding of Carbon Molybdenum Steel Pipe—A. N. Kugler, Applied Engineering Dept., Air Reduction Sales Co.

Single Pass Electric Welding of Unfired Pressure Vessels—R. M. Wallace, Asst. Supt., The Griscom Russell Co.

Welding Structures—Albert S. Low, Vice-president, The Austin Co.

Welding, Cutting and Machine Design of Small Sub-Assemblies—Edward J. DeWitt, vice-president, Wallace Supplies Mfg. Co.

Welding as Applied to Fabrication of Industrial Stokers—F. R. Mason, Riley Stoker Corp.

Methods for the Manufacture of Precision Assemblies by Resistance Welding—F. D. Rogers, International Business Machines.

Arc Welding as Influenced by Shop Preparation, Tools, Jigs and Fixtures—M. S. Evans, American Car & Foundry Co.

Physical and Chemical Properties of the Nickel-Iron Alloys Formed in the Welding of Nickel Clad Steel—W. G. Theisinger, Lukens Steel Co. and F. G. Flocke, International Nickel Co.

Weldability of Medium Carbon Steel—R. W. Emerson, Westinghouse Elec. & Mfg. Co.

The Effect of Current, Pressure and Time on the Shear Strength and Structure of Spot Welds in the Aluminum Alloys — G. O. Hoglund and G. S. Bernard, Jr., Aluminum Company of America.

An Investigation of Arc and Gas Welded Joints in Aluminum and Aluminum Alloys—Lieutenant Commander R. K. Wells (CC) U.S.N. and A. G. Bissell, Bureau of Construction and Repair, Navy Dept.

TUESDAY, OCTOBER 18

Welding of Ammonia Containers—E. H. Behling, Vilter Mfg. Co.

Brazing Tubes in High-Pressure Boilers with Silver Alloys—A. W. Weir, New York Central Railroad and H. M. Webber, General Electric Co.

Welding Bronze and Non-Ferrous Alloy Piping — H. D. Lanterman, Carbide and Carbon Chemicals Corp.

Welded Joints in Carbon Molybdenum Piping—R. W. Clark, General Electric Co.

A Quick Shop Test for Quality of Weld and Its Correlation with the Standard Tests—W. J. Conley, University of Rochester.

Effect of Rigid Beam-Column Connections on Column Stresses—Inge Lyse and E. H. Mount, Lehigh University.

Residual Stresses Due to Circumferential Welds in Pipes—E. L. Eriksen, University of Michigan.

Welding Arcs from the Standpoint of Recent Investigations—Dr. C. G. Suits, Research Laboratory, General Electric Co.

Quality and Efficiency in Oxygen Cutting—George M. Deming, Air Reduction Sales Co.

Bi-Metal Construction of High Temperature Steel Valves—E. R. Seabloom, Crane Co.

Weld Penetration—John Hruska, Chief Metallurgist, Electro-Motive Cop.

Bronze-Welding—W. S. Walker, Linde Air Products Co.

Photoelastic Analysis of Stresses in the Lap Plates of Welded Joints—A. G. Solakian, Polarized Light Co.

Metallurgical Aspects of Resistance Welding Electrodes—Dr. R. H. Harrington, Research laboratory, General Electric Co.

Crater Formation in Arc Welding—Gilbert E. Doan, Lehigh Univesity.

Creep Test of Arc-Welded Low-Carbon Steel —N. F. Ward, University of California.

Stress Distribution in Welds Subjected to Bending—C. D. Jensen and R. E. Crispen, Lehigh University.

WEDNESDAY, OCTOBER 19

Recent Developments in Welding of Machine Tools—L. F. Nenninger, Chief Engineer, and W. A. Maddox, Welding Supervisor, Cincinnati Milling Machine and Cincinnati Grinders, Inc.

Machine Flame Cutting with Small Machines —Otto C. Voss, Allis-Chalmers Mfg. Co.

Welding and Cutting in Machinery Construction—J. Gordon, General Manager, Taylor Winfield Corp.

Progress in Copper Welding—Ira T. Hook, Research Engineer, and Clinton E. Swift, Welding Engineer, American Brass Co.

Carbon Arc Welding of Silicon Bronzes—E. S. Bunn, J. R. Hunter and W. G. Seidlitz, Revere Copper and Brass, Inc.

Studies of the Spot Welding of Low-Carbon and Stainless Steels—W. F. Hess and R. L. Ringer, Jr., Rensselaer Polytechnic Institute.

Shrinkage and other Initial Stresses in Welds M. F. Sayre and E. A. Winzenburger, Union College

THURSDAY, OCTOBER 20

Flame Hardening with the Oxy-Acetylene Flame—H. J. Shepperd, Chief Metallurgist, Kelsey Hayes Wheel Co.

Automobile Body Welding—E. H. Foss, Murray Corp.

Welding of Rear Axle Housing—E. L. Bailey and V. Knecht, Chrysler Corp.

Resistance Welding in the Automotive Industry—A. Di Guilio, Ford Motor Co.

Automatic Carbon Arc Welding in the Automotive Industry—F. M. Maichle, Lincoln Electric Co.

Use of Welding in Reconditioning Used Cars—T. W. Moss, Chrysler Motors Service.

Arc Welding Road Equipment—Elmer Isgren, Supt., R. G. LeTourneau, Inc.

FRIDAY, OCTOBER 21

Arc Welding of Truss Type Railroad Car —A. M. Unger, Pullman-Standard Car Mfg. Co.

Flash Welding of Rails—H. C. Drake, Sperry Products, Inc.

Machine Gas Cutting in a Large Steel Foundry—W. D. Murray, General Foreman, Steel Foundry Division, Canadian Car & Foundry Ltd., and H. E. Horwood, Railway & Eng'g Specialties, Ltd.

# PERSONALS

R. B. BARNETT, formerly assistant sales manager of the Union Drawn Steel division, Republic Steel Corp., has become manager of the Buffalo office of Peter A. Frasse & Co., steel distributors.

L. V. BLACK has been appointed superintendent of the electrical department, Bethlehem plant, Bethlehem Steel Co. Mr. Black succeeds A. J. STANDING, deceased.

THOMAS H. BLAIR has been made sales manager of the Canadian activities of the E. W. Bliss Co. with headquarters in Toronto. In addition to having been works manager of the Brooklyn plant for a number of years, Mr. Blair has been employed in the company's Toledo machine and tool division, consolidated press division and the Marquette tool and manufacturing division. He returns to Canada after an absence of seventeen years.

PROF. JOHN J. CATON, dean of the Chrysler Institute of Technology, has been voted an honorary membership in the American Society of Tool Engineers. Prof. Caton received his honorary membership certificate from FORD R. LAMB, executive secretary of the society, at the Schenectady chapter meeting Sept. 15. His is the second such honor to be bestowed by the society, the first having been awarded in 1935 to JOHN YOUNGER, president of Ohio State University.

F. J. HEALY has been appointed general manager of the Hygrade lamp division of Hygrade Sylvania Corp., according to an announcement by E. J. POOR, chairman of the board.

J. W. MERIAM, for the past 24 years vice-president and secretary of the Lincoln Electric Co., Cleveland, has retired at the age of 60. Mr. Meriam will remain a director of the company, his duties as secretary being taken over by A. F. DAVIES, vice-president.

RALPH J. REICH has been appointed manager of the Buffalo branch of Gar Wood Industries, Inc., according to an announcement made by W. H. HAMMOND, sales manager of the company's hoist and body division.

T. KENNEDY STEVENSON has been elected president and a director, Electrical Research Products, Inc., a subsidiary of the Western Electric Co. He succeeds the late WHITFORD DRAKE. Associated with Western Electric for 24 years, Mr. Stevenson has also worked for American Locomotive Co. and Duplex Metals Co.

# BUSINESS ITEMS

Anderson Diesel Engine Co., Anderson, Indiana, liquidation is being handled by WILLIAM HANZEL. All machinery, small tools, motors, miscellaneous equipment, buildings and land are being sold.

Auburn Automobile Co., as a further step in its plan for diversification of its manufacturing activities, has contracted to produce refrigerated store display cases for the Winter Air Products Corp. of Chicago. Equipped with Westinghouse hermetically sealed refrigerator units, they will be sold nationally through Westinghouse dealers and distributors.

Auburn discontinued the building of automobiles last year and is now engaged in the manufacture of metal sinks and cabinets, beverage coolers, electric fans, automobile bodies and miscellaneous metal stampings and assemblies for the automotive and refrigerator industries.

Aviation Mfg. Corp. announces that it has liquidated the Stinson Aircraft Corp. and made it a division of the company. O. R. STOCKE has been made a vice-president of the corporation and will supervise the manufacture of Stinson airplanes.

Bridgeport Brass Co. announces completion of a new $4,500,000 rolling mill at its Bridgeport plant. The new mill, in which all rolling operations of the company will be performed, marks the completion of the first major step in the company's expansion and modernization program.

Continental Machine Specialties, Inc., has provided an eastern outlet for its line of "Do-All" contour machines in a new sales office recently opened in New York City.

The General Electric Co. will build at its Schenectady plant the largest steam-driven turbine-generator constructed since 1931. Rated at 80,000 kw., the equipment will be installed in a steam-electric station to be built by the New York Central Power Corp. at Oswego.

The Giebel Machine Tool Co., of New York, N. Y., has been appointed representative for the Ferracute line of power presses.

The Gisholt Machine Co. recently devoted a day to a unique practice, that of holding "open house" for employees and their families at its plant in Madison, Wis. Held for the purpose of familiarizing workers' families with the organization and the men who run it, the function proved such a success that the management is considering holding a similar "open house" for the entire community.

The lamp division of Hygrade Sylvania Corp. at Salem has placed orders for new machinery approximating $50,000.

The Modine Co., manufacturer of auto and industrial radiators, Racine, Wis., has purchased property consisting of eleven buildings and thirteen acres of land from Belle City Mfg. Co. The latter company, manufacturer of farm equipment, has purchased the Ajax Rubber Co. plant with a manufacturing space of 180,000 sq. ft.

Simonds Saw & Steel Co. has resumed construction on the first windowless factory to be built for American industry. Delayed seven years by the depression, work is being rushed to completion by the Austin Co., builders.

Located at Fitchburg, Mass., the new five-acre single-room plant will house manufacturing facilities now occupying over seventeen acres of space in three separate locations. With the intention of

providing absolutely uniform working conditions 24 hours a day the year round, the designers have not only eliminated all windows but also have completely soundproofed and air conditioned the building. Among the modern equipment installed will be individual motor drive for each machine and a lighting system capable of supplying 20 foot-candles or better throughout the entire plant.

Trico Fuse Mfg. Co. of Milwaukee announces the appointment of the Marine Specialty & Mill Supply Co. of New Orleans as Louisiana agent-distributor for the entire Trico line.

The U. S. Machine Corp. of Lebanon, Ind., maker of stokers and air conditioning equipment, has expanded its plant and office facilities.

## OBITUARIES

WILLIAM LAMOTTE DAY, former president and general manager of the General Motors Truck Co., died Sept. 6 in Ann Arbor, Mich., at the age of 75.

Prior to his retirement in 1924, Mr. Day had also been a vice-president and a director of General Motors Corp. He was well known in automotive circles, being a member of the Detroit and the Pontiac Boards of Commerce, as well as taking an active interest in the affairs of many local social organizations.

FAY LEONE FAUROTE, 59, native of Niles, Michigan, and widely known in advertising and automobile manufacturing circles, died at his home in Long Island City, New York, September 6.

An extremely versatile man, Faurote made a name for himself in advertising, public relations, automobile manufacturing, aviation and radio. In some respects too he was a pioneer in each of these fields of modern development. He also was the author of a number of books of wide circulation.

Educated at the University of Michigan, where he received a degree of bachelor of science in mechanical engineering in 1903, Faurote was a classmate of the late Howard M. Coffin, former vice-president and general manager of the Hudson Motor Car Company. The two started business life with the Olds Motor Works at Lansing, Faurote later becoming advertising manager of the company. Faurote and Coffin founded the Detroit Motor School which later became the Detroit Institute of Technology. He also was advertising manager of the Thomas Motor Car Co. of Buffalo and handled the New York-Paris Automobile Race around the World.

For years Mr. Faurote was director of public relations of the Society of Automotive Engineers, and a frequent contributor of articles to technical and trade magazines. He was a charter member of the American Association of National Advertisers, and belonged to many other scientific and trade associations.

MILTON B. HANSON, 43, for the past 15 years secretary-treasurer of the Hanson Clutch & Machinery Co., Tiffin, Ohio, died of pneumonia.

**ROBERT B. BEALE**

ROBERT B. BEALE, 60, manager of General Electric's turbine division of the central station department at Schenectady, died of a heart ailment Sept. 11 after a brief illness.

Mr. Beale had been continuously associated with the company since the beginning of the century, when he entered the organization as a test man. Since that time he has served in the d. c. engineering department, the lighting commercial department and the central station department. He was named manager of the turbine division in 1933, upon the retirement of E. E. GILBERT.

WILLIAM B. HARSEL, for eight years mechanical engineer for the Universal Gear Corp., Indianapolis, died in Chicago following a traffic accident. He was 65 years old.

WALTER V. HELMEL, vice-president and a director, Motor Products Corp., Detroit, died August 27. He was 51 years of age and had been with the company since 1916.

GEORGE F. JENKS, prominent in the machine tool sales field at Holyoke, Mass., died at his home in that city on Sept. 12. He was born in Cheshire, Mass., in 1875 and formerly was active in newspaper publishing.

WALTER C. LONGENECKER, 68, for the past 30 years treasurer of the Toledo Pipe Threading Machine Co., died Sept. 10 at his home in that city.

EDWARD J. MILLER, glass-making machinery manufacturer who retired in 1933 saying that "when a man has made a million, it's time for him to quit," died Sept. 9 in Columbus following a week's illness. He was 64 years of age.

EARL F. PAYNE, purchasing agent of the Pawtucket (R.I.) Mfg. Co., lost his life on Sept. 6 as the result of an automobile accident in Westwood, Mass. He was born in Chicopee, Mass., 39 years ago and had resided in Pawtucket for 21 years.

MATHIAS T. SASGEN, one of the founders of Sasgen Derrick Co., Chicago, Illinois, died September 6 at the age of 59. He and his brother Michael founded the company in 1908.

PETER J. SHRUM, superintendent of the Pittsburgh Bolt & Screw Corp., died at the age of 67 in Monaca, Pa., following a brief illness.

## MEETINGS

AMERICAN GAS ASSOCIATION. Twentieth annual convention, Oct. 10-13, Atlantic City, N. J. ALEXANDER FORWARD, managing director, 420 Lexington Ave., New York City.

AMERICAN GEAR MANUFACTURERS ASSOCIATION, Skytop Lodge, Pocono Mountains, Pa., Oct. 10, 11 and 12. Secretary of the Association: J. C. MCQUISTON, Shields Building, Wilkinsburg, Pa.

AMERICAN SOCIETY FOR METALS. Twentieth Annual Metal Show and Exhibition. Convention Hall, Detroit, Oct. 17-21. W. H. EISENMAN, secretary, 7016 Euclid Ave., Cleveland, Ohio.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS. First Fall meeting, Biltmore Hotel, Providence, R. I., Oct. 5-7. Society secretary, C. E. DAVIES, 29 W. 39 St., New York City.

AMERICAN SOCIETY OF TOOL ENGINEERS. Semi-annual meeting, Oct. 14-15. Pittsburgh, Pa. FORD R. LAMB, executive secretary, 2567 W. Grand Blvd., Detroit.

AMERICAN WELDING SOCIETY, Nineteenth Annual Meeting, Book-Cadillac Hotel, Detroit, Mich., Oct. 16-21. Society secretary, M. M. KELLY, 29 W. 39 St., New York City.

ASSOCIATED MACHINE TOOL DEALERS OF AMERICA. Annual convention, Cincinnati, Ohio, Oct. 10 and 11. Convention headquarters at Hotel Alms. Executive secretary of the organization: THOMAS A. FERNLEY, JR., 505 Arch St., Philadelphia, Pa.

ASSOCIATION OF IRON AND STEEL ENGINEERS, Annual Convention and Exposition, Cleveland, Sept. 27-30. Convention at Hotel Statler, exposition at Cleveland Public Auditorium.

NATIONAL ASSOCIATION OF FOREMEN. Dayton, Ohio, October 14, 15 and 16.

NATIONAL AUTOMOBILE SHOW, Grand Central Palace, New York, N. Y., beginning Nov. 11.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION, Annual Meeting, Oct. 24-28. Palmer House, Chicago. J. W. DONALD, managing director, 155 E. 44 St., New York City.

NATIONAL SAFETY COUNCIL. National Safety Congress, Oct. 10-14. Stevens Hotel, Chicago. Council secretary, H. J. GRIFFITH, Jones & Laughlin Steel Corp., Pittsburgh.

PORCELAIN ENAMEL INSTITUTE. Third annual forum, October 12-14. University of Illinois, Urbana, Illinois. Committee Chairman, F. E. HODEK, JR., General Porcelain Enameling and Manufacturing Co.

Eighth annual meeting, October 25 and 26. Cleveland.

SOCIETY OF AUTOMOTIVE ENGINEERS.

National truck, bus and rail car meeting, Oct. 4 and 5, Chicago.

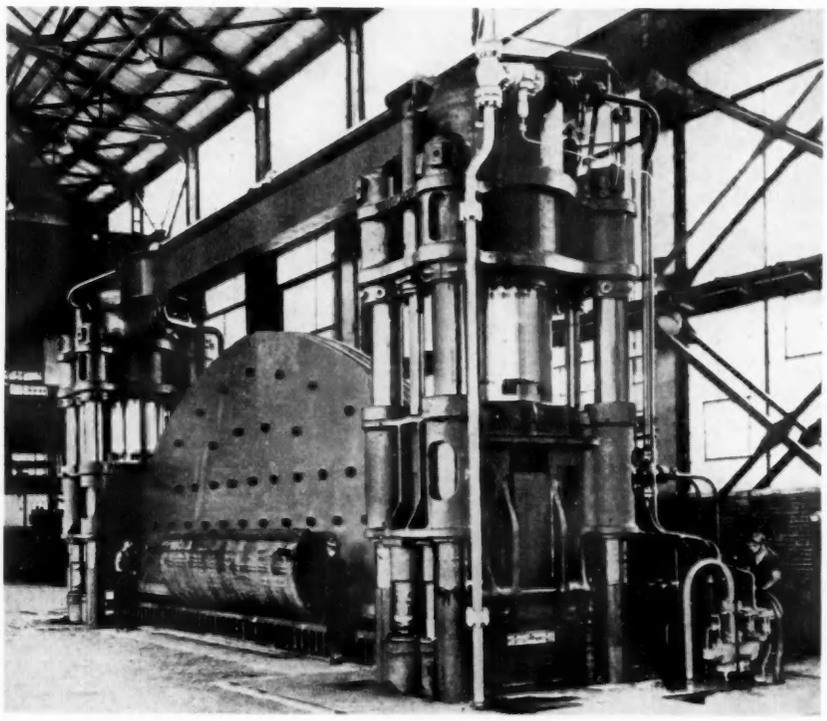
National regional fuels and lubricants meeting, Oct. 6 and 7, Tulsa, Okla.

National aircraft production meeting, Oct. 13-15, Ambassador Hotel, Los Angeles, Calif.

# SHOP EQUIPMENT NEWS

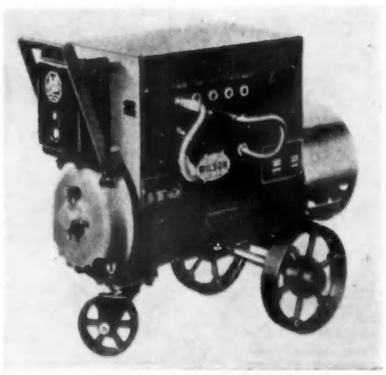
## Southwark 6,000-Ton Bending Press

Two 3,000-ton capacity, specially-designed vertical hydraulic presses connected by 52-ft. long bending beams comprise the 6,000-ton bending press recently built by the Baldwin-Southwark Corp., Philadelphia, Pa., for the Chattanooga, Tenn., plant of the Combustion Engineering Corp. The bending beams are of steel plate construction, and are 15 ft. deep and 20 in. thick. The bottom beam, similar in construction to the top beam shown in the accompanying illustration, is below the foundation line and rests on the cast-steel bottom platen of each press.



The two hydraulic presses have 50-in. diameter rams and operate under 3,000 lb. per sq. in. pressure. Forged steel columns for these presses are 16-in. in diameter. Over-all height of each press is 40 ft., of which 15 ft. extends below the floor line. Each press has a 15-ft. square base. Total weight of the complete machine is approximately 2,000,000 lb. An equalizing arrangement, including control of pressure in both cylinders and a special swiveling and thrust block arrangement on the moving beam, permits eccentric loading without throwing any side strains on either press.

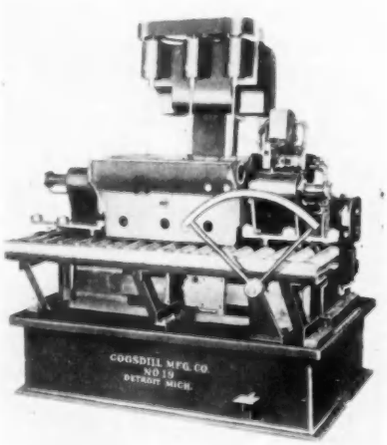
## Wilson Model SC 100-Amp. Arc Welder



The Model SC, single operator 100-amp. motor generator arc welder, offered by the Wilson Welder and Metals Co., Inc., 60 E. 42nd St., New York, N. Y., is designed primarily for light gage work. Adjustment of the output for the generator is accomplished by five marked receptacles with plugs for current or heat control and a multipoint field rheostat for adjustment of the open circuit voltage. Maximum diameter of electrode which can be used is 5/32-in. bare, light coated, shielded or heavy-coated. The arc voltage rating is 20-30 volts and welding range is 30-125 amp. Both portable and stationary units are available.

## Cogsdill No. 19 Bearing-Izer

Three precision spindle units, together with the driving motor, are mounted on the headstock of this multiple-spindle No. 19 Bearing-izing unit recently constructed by Cogsdill Twist Drill Co., Inc., 6511 Epworth Blvd., Detroit, Mich., for finishing three valve lifter bores in an internal combustion engine block at each cycle of the headstock. Main headstock is mounted on the top of



a hydraulically-operated, vertical-traveling ram. Cylinder blocks are picked up by air-operated plungers which enter the camshaft bores. Movement of a control lever causes the ram to move down rapidly until a cam engages the feed control valve to produce the desired feed of the tools through the bores.

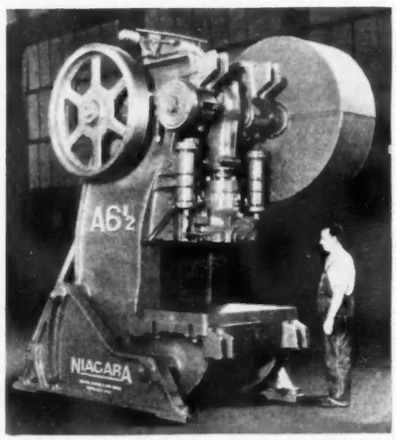
Up stroke of the spindle can be halted when the tools are out of the bore and the headstock and ram carrier indexed to the next position. An index plunger for locating the carrier is interlocked with the operating lever so that it is not possible to move the ram down unless the tools are in line with the bores to be processed. Spindles operate at a speed of 2,500 r.p.m. and drive the Bearing-izing tools so as to produce approximately 200,000 blows per min. of the cam-actuated peening rolls on the surfaces of the bore.

## Thomson-Gibb Model B Impoved Spot Welders

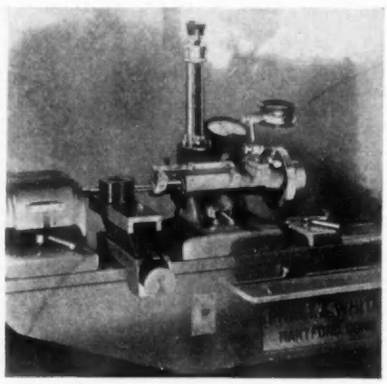
Offered with 8, 12 and 18-in. throat depths and with 10, 15 and 20 kva. transformer capacities, the Model B spot welders developed by Thomson-Gibb Electric Welding Co., 164 Pleasant St., Lynn, Mass., are of fabricated steel box-type construction. Welding arms are $1\frac{3}{4}$ in. in diameter, and height of work above floor is approximately 40 in. Vertical adjustment of the lower arm is not provided as standard, but a special drop apron may be furnished to provide a 5-in. drop of the lower arm. This arm has a horizontal adjustment of $\frac{1}{2}$ in. and the upper arm has an in and out adjustment of $\frac{1}{2}$ in. Opening between the $\frac{7}{8}$ in. diameter electrodes is 1, $1\frac{1}{2}$ and $2\frac{1}{4}$ in. for the three different sizes.

## Niagara No. A-6½ Inclinable Press

The No. A-6 $\frac{1}{2}$ Master Series inclinable press offered by Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y., features two air counterbalances which are connected to the slide. A heavy-duty 14-




point engagement sleeve clutch is used and is provided with a built-in single stroke mechanism. Adjustable and removable gibs are provided with multiple V-ways. The self-contained back gear assembly is provided with anti-friction bearings and is mounted within the frame.



## P. & W. Standard Measuring Machine

An electrolimit pressure tailstock has been added to the standard measuring machine, offered by Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn., for controlling measuring pressures. This machine consists of a master bar, a dividing screw and a pressure tailstock. The master bar is graduated at each 1-in. interval, providing a permanently accurate setting. The graduations are extremely fine hair lines visible only through a microscope carried by the measuring head.

The electrolimit pressure tailstock makes any pressure from 1 to $2\frac{1}{2}$ lb. in increments of 8 oz. instantly available and it makes possible the duplication of exact measuring pressures, even with different operators. By turning the dividing screw on the measuring head, the work is pressed against the tailstock anvil until the pointer of the microammeter reaches the center of the scale. This indicates that the desired measuring point has been reached. Then the size is read on the graduated dial in the head stock, which provides direct readings to 0.00001 in.

## Portman Abrasive Cut-Off Machine

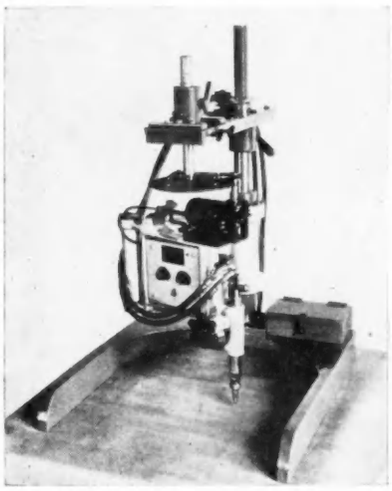
Universal work head of the abrasive cut-off machine announced by Portman Machine Co., 2236A Bathgate Ave., New York, N. Y., permits cutting of angles and bevels with the work always straight across the face of the table. The machine is equipped with a fully automatic fence which is self compensating for all angles and requires no attention on the part of the operator. No belts or pulleys are used in the drive, the 16-in. diameter blade being mounted directly on the motor spindle. This motor is of 5 hp. capacity and is of a specially designed square-frame type having a small spindle center distance.

Arm is balanced by an adjustable spring arrangement and is provided with a pin to lock the arm in position for a 90 deg. cut. The head is arranged to swivel 45 deg. to the left from the vertical position, while the table can be turned as much as 45 deg. right or left. Specifications: height of work table above floor, 34 in.; diameter of round work table,

16 in.; length of slot in table, 15 in.; length of fence, 28 in.; height of fence, 2½ in.; capacity for round stock, 2½ in.; maximum clearance under motor, 3¾ in.; maximum width of cut, 7½ in.; floor space required, 48 x 48 in.; net weight, approximately 900 lb.

## O.M.W. Model SC-24 Gas Shape Cutter

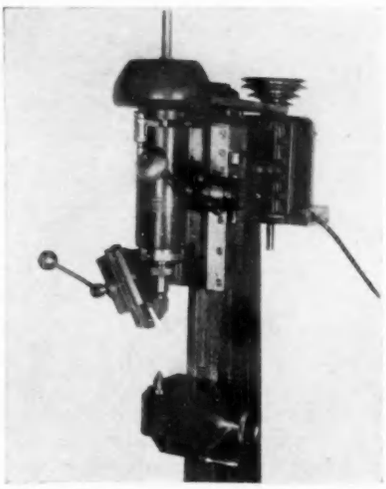
Templet-tracing and automatic circle and straight-line cutting can be performed with the Model SC-24 shape cutting machine developed by Ohmstede Machine Works, 897-899 N. Main St., Beaumont, Tex. Plywood templets, ¼-in. thick, are fastened to the templet mandrel to guide the spiral cut roller, which controls the movement of the blowpipe through the medium of two pivoted arms for



shape cutting. The blowpipe and variable-speed motor are attached to the outer end of the second pivoted arm. Cutting range is 56-in. lengthwise and 24-in. laterally. Circles ranging from 2¾ to 24-in. in diameter are cut automatically. Specifications: speed range, 2-22 in. per min.; thickness cut with standard nozzle, 12 in.; over-all dimensions, 28½ x 30 in.; net weight of complete machine, 274 lb

## Ex-Cell-O Center Lapping Machine

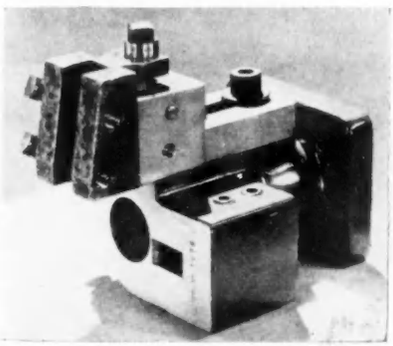
Consisting essentially of a base and column, a motor-driven single high-speed precision ball bearing spindle carrying the abrasive stone, an adjustable work rest and a dressing device, the center-lapping machine announced by Ex-Cell-O Corp., 1228 Oakman Blvd., is suitable for ac-



curately centering parts which are to be ground between centers to close tolerance on the diameter for roundness. It can be used for lapping centers on work up to 8 in. in diameter and up to 36 in. long. One end of the work is placed on a vertically adjustable center which can be positioned by means of a hand crank. The spindle carrying the lapping stone then is lowered to lap the center in the other end.

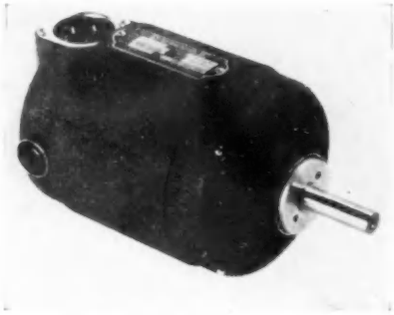
## Gisholt Combination Multiple-Cut Tool

A tool for combining turning, boring and facing operations on turret lathes has been offered by the Gisholt Machine Co., Madison Wis. Use of forming tools in this unit makes it possible to cut radiuses or other desired shapes while boring and facing or turning. Exact diameter size is obtained through the use of a micrometer graduated screw. The turning arm is mounted on an adjustable slide so that long or short cuts may be taken on the diameter. Drills, boring bars and facing bars can be carried in the center hole. This tool bolts to the turret face and is made especially for No. 3, 4, and 5 ram-type universal turret lathes.



## Dumore Type W High-Speed Motors

Preloading springs eliminate and play and compensate for bearing wear in the Type W high-speed universal motors, developed by the Dumore Co., Racine, Wis. These motors have a varying speed characteristic and will operate on a.c. and d.c. The Type W motor is rated at ⅓ hp. for a.c. operation and ½ hp. for d.c. operation. Full-load speed is 6,500 r.p.m. and no-load speed is 1,500 r.p.m. Standard winding is for 115 volt operation. The slightly larger Type W2 Motor is rated at ½ hp. for a.c. operation and at ⅔ hp. for d.c. operation. Full-load speed of this motor is 8,000 r.p.m., while no-load speed is 1,800 r.p.m.



## L.-S. Hydraulic "Footlift" Truck

The hydraulic "Footlift" truck announced by the Lewis-Shepard Sales Corp., 117 Walnut St., Watertown, Boston, Mass., incorporates a "dead-

man" release control which gives variable lowering speeds. Standard capacities range from 3,500 to 8,000 lb. and lowered frame height ranges from 6 to 11 in. Frame widths are 18 or 27 in.

Shockless lowering provided by the release control is claimed to give maximum protection to fragile loads. Short handle is equipped with a spring hold-up, and the large diame-

ter dual front wheels are said to eliminate handle whip. Foot pedal which operates the hydraulic power unit can be used with either full-length or short inching strokes.

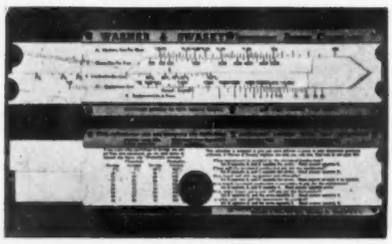
## G. E. Self-Contained Lighting Unit

All of the elements necessary for the production of controlled light are combined in the single glass bulb of the "Projector" lighting unit announced by General Electric Co., Nela

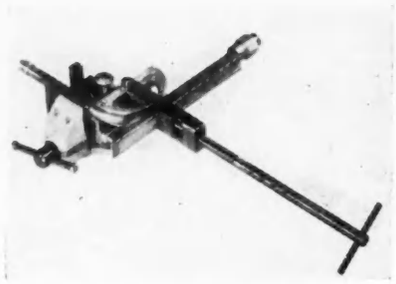
Park, Cleveland, Ohio. This unit embodies a pressed glass reflector and a light redirecting cover lens as part of a funnel-shaped glass bulb. It is available with two types of cover lenses, one giving a wide-spread beam for general floodlighting; the other providing a powerful narrow beam for spot-lighting applications.

## W. & S. Slide Rule

The Warner & Swasey Co., Cleveland, Ohio, is distributing a slide rule designed to simplify the calculation of profit possibilities in equipment purchases. Equipped with five scales, three of them movable, the slide rule permits a rapid calculation



of any of the following factors when the others are know or can be approximated: (1) cost; (2) increased production possible; (3) number of hours used per year; (4) machine cost per hour; and (5) useful length of life.

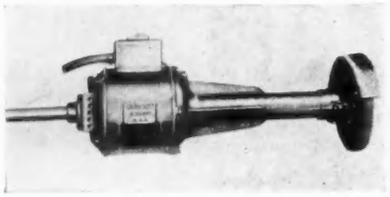


## "SAC" 4-In-1 Tube Shaping Tool

Copper and aluminum tubing can be bent, cut, flared and swedged in the 4-in-1 tube shaping tool developed by Sac Tool Mfg. Co., 1907 Washington Ave., St. Louis, Mo. The unit may be bolted to a bench or used by hand. Circular blocks are adjustable to permit making a bend back of a flare nut.

## Wodack Portable Suspension Grinders

Equipped with an 8 x $\frac{3}{4}$-in. grinding wheel, steel guard and a 15-ft. 3-conductor rubber-covered cord, the portable aerial grinders announced by Wodack Electric Tool Corp., 4627–29 W. Huron St., Chicago, Ill., have a suspension ring for attachment to a



suspension cable or arm. These grinders are said to be especially suited for grinding operations on castings, forgings and sheet metal parts.

## "Micro" Series Q Metal-Clad Switch

Micro Switch Corp., Freeport, Ill., has developed the Series Q metal-clad micro switch for applications requiring a movement up to $\frac{1}{4}$ in. beyond

the operating point without straining the snap action mechanism, changing its characteristics or affecting its life. A pre-travel of 0.015 in. movement with an operating pressure of 7–8$\frac{1}{2}$ oz. and a movement differential of 0.0002–0.0003 in. is required to operate the switch.

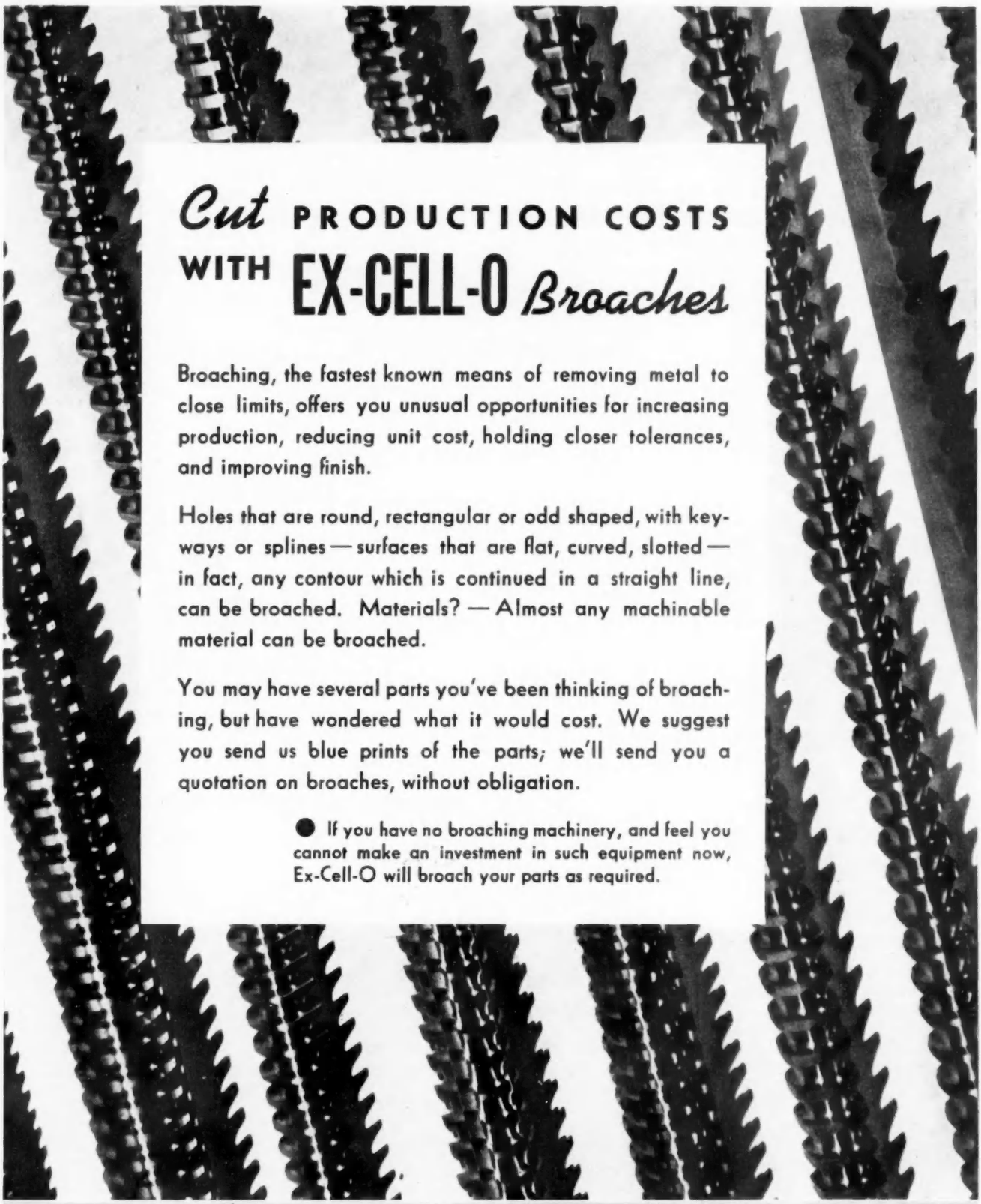
Contact arrangements can be made for normally closed, normally opened, or double-throw circuits. This switch is placed and sealed in a metal housing with a right- or left-hand angle conduit fitting threaded for $\frac{1}{2}$-in. pipe. The switch is listed for 10 amp., 125 volts a.c., 2 amp., 600 volts a.c., and for $\frac{1}{2}$-hp. motors on 115-460 volts a.c.

## "Doall" Illuminated Magnifying Glass

A 15-watt lamp is inclosed in the same fixture as the 2-power magnifying glass in the illuminated unit developed by Continental Machine Specialties, Inc., 1301 Washington Ave. S., Minneapolis, Minn. Lens measures 2 x 3$\frac{3}{4}$ in. and is claimed to permit vision with both eyes without strain. A ball joint is incorporated in the supporting mechanism, permitting the glass to be adjusted quickly to the required position. A double lock clamp is provided. This unit can be clamped on any 1 x 1$\frac{1}{2}$ in. post and it may be used at inspection benches or for other applications, as well as on "Doall" sawing and filing machines.

## Hopkan Locking Rivet

Said to be particularly suited for use in confined spaces, with fragile materials or wherever heating, hammering or upsetting is impractical, the Hopkan locking rivet, developed by Hopkan Rivet Co., Inc., 128-130 Latham St., Pittsburgh, Pa., has a serrated split stud which locks within an internally serrated sleeve. These serrations, which are not threads, are formed with one vertical and one



# *Cut* PRODUCTION COSTS WITH EX-CELL-O *Broaches*

Broaching, the fastest known means of removing metal to close limits, offers you unusual opportunities for increasing production, reducing unit cost, holding closer tolerances, and improving finish.

Holes that are round, rectangular or odd shaped, with keyways or splines — surfaces that are flat, curved, slotted — in fact, any contour which is continued in a straight line, can be broached. Materials? — Almost any machinable material can be broached.

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Please send more information on Ex-Cell-O's Broach Service (also on the products I have checked).

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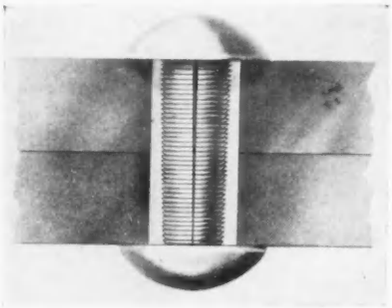


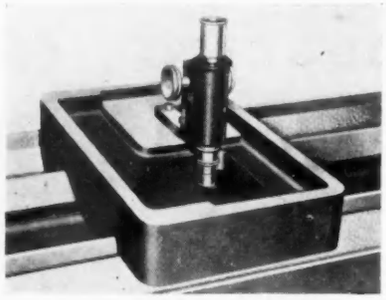
tapered face. When the stud is forced into the sleeve under pressure, the two halves of the stud spring together at the slot. The principle has been reversed for special applications, using a solid serrated stud with a split internal serrated sleeve. This is desirable where external expansion is required, to form a tight fit within a hole. Diameters ranging from $\frac{3}{16}$ to $1\frac{1}{2}$ in. or larger are available, with no limit as to length.

## Williams No. AL-101 Socket Wrench Set

Containing 19 pieces, the No. AL-101 "Supersocket" wrench set for hollow screws, offered by J. H. Williams & Co., 75 Spring St., New York, N. Y., will handle hollow hexagon socket set screws from $\frac{1}{4}$ to $1\frac{3}{8}$ in., and hollow cap screws ranging from No. 8 to 1-in. Included in this set is the recently announced No. B-21 Torque "Meassurrench" for indicating right-hand turning torque.

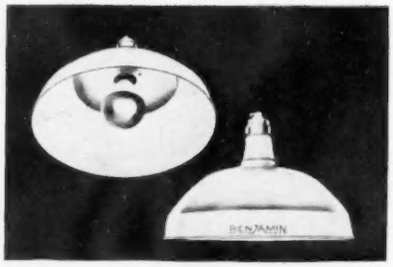
## Cincinnati Microscope Aligning Instrument

Designed specifically for aligning long grinding machine beds, the microscope aligning instrument developed by Cincinnati Milling Machine and Cincinnati Grinders Inc., Cincinnati, Ohio, consists of a cast-iron platen having a V and a flat bearing, duplicating the table bearing surface which contacts the bed. Mounted on the platen is a microscope having an accurately divided scale across the optical field. This scale, graduated in 0.0005 in., indicates the deviation of the guiding V-way from a straight line when readings are taken at regular intervals and at the same side of a wire stretched tight from one end of the bed to the other.



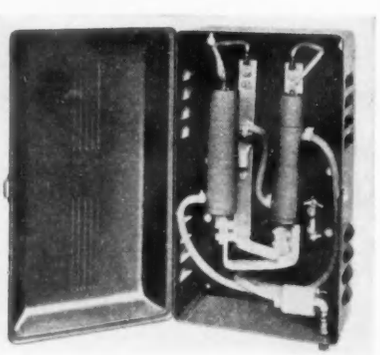
## Benjamin Type RLM Light Diffuser

A combination of porcelain enamel and Alzak aluminum reflecting surfaces and the use of a silvered bowl lamp are claimed to give a softer and better diffused elimination from the Type RLM "Silvered Bowl" diffuser lighting unit announced by Benjamin Electric Mfg. Co., 120-128 S. Sangamon St., Des Plaines, Ill. The aluminum reflector is located in the top of the unit.



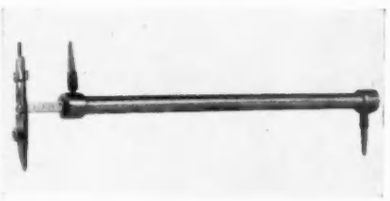

## Westinghouse Offers "Weld-O-Trol" Switch

For welding mild steel products and other readily-welded metals, the "Weld-O-Trol" electronic power switch developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., for controlling the primary of welding transformers is suitable for use with existing timing devices. With either sealed-off or continuously pumped ignition tubes, the Weld-O-Trol is free of moving parts, arcing contacts and noise. Available ratings are roughly equivalent to 300 and 600 amp. conventional welding contactors.



## Ross Model 191 High-Speed Valve

Two solenoid-controlled air valves, especially designed for high-speed service such as that required for numerous welding operations, have been announced by the Ross Operating Valve Co., 6488 Epworth Blvd., Detroit, Mich. One of these units is for the control of a single acting, and the other for the control of double-acting cylinders. The Model 191 unit for double-acting cylinders is shown. Air-line pressure is used for reversing the valve action, thus eliminating return springs and making possible the use of smaller solenoids in valves of the same capacity.



## "Ackron" Graduated Beam Compass

Available in 12, 24 and 36 in. sizes, the "Ackron" graduated beam compass, distributed by Favor Ruhl Co., 425 S. Wabash Ave., Chicago, Ill., is suitable for a number of drawing room requirements. Two needles are provided in the beam, so that radiuses

KNIGHT
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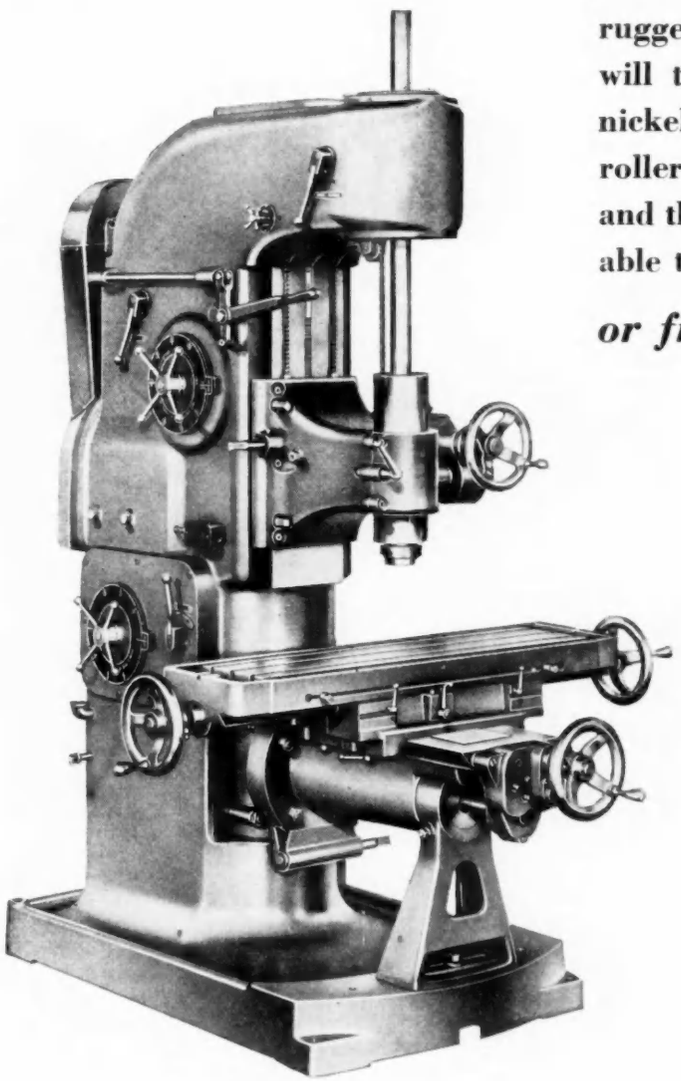
# BUILT TO "TAKE IT"

## *ANY WAY YOU LOOK AT IT*



**If the problem requires heavy cuts the rugged construction of the Knight Miller will take it. The solid forged chrome nickel steel spindle running in tapered roller bearings; the semi-bed type table and the heavy rigid unit construction enable the Knight Miller to stand the gaff.**

### *or from another angle*

**The problem may be one of handling many different jobs with the least amount of equipment. Here again the Knight Miller can take it, for, with its universal features the Knight Miller is equally well adapted to milling or boring either plain or angular on large or small work.**

**Can a Knight Miller take your jobs?**

**Write and find out.**

## W. B. KNIGHT MACHINERY CO., ST. LOUIS, MISSOURI

above 9-in. can be drawn by using the farthest needle. Combination pen and pencil unit can be reversed in the beam.

## Metco Type E Metallizing Gun

Improved spraying characteristics are claimed for the "Metco" Type E metallizing gun offered by Metallizing Engineering Co., Inc., 44 Whitehall St., New York, N. Y. Extremely fine coatings are said to be obtainable at production speeds. Simplified ad-

justments permit continuous operation with maintained speed and quality. The gun weighs 3¾ lb. and has an easy hand grip for use in coating large structures, or it can be mounted in a lathe for building up worn shafts and similar parts. Bulletin No. 37 lists spraying speed in pounds per hour for a number of metals, and discusses other features of the unit.

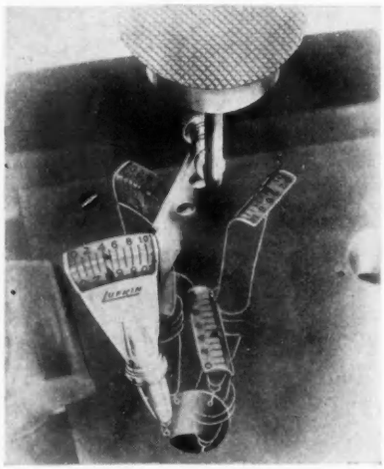
## Siefen "Nuglu" Abrasive Bond

Any improved abrasive bond for use on polishing wheels has been introduced by the J. J. Siefen Co., 5657 Lauderdale Ave., Detroit, Mich. This bond, listed as "Nuglu", is provided in three grades of consistency for setting up all types of polishing wheels, belts and disks.

"Nuglu" is claimed to remain permanently flexible, even under the friction heat generated by the polishing operation. It sets rapidly under heat, making it possible to force-dry wheels.

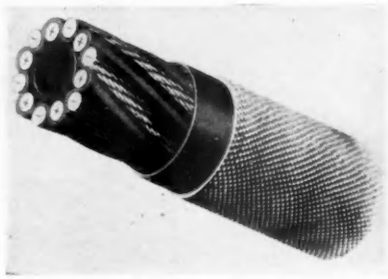
## Lufkin No. 199 "Universal" Indicator

A rotating head, positive lock and two reading faces are featured in the No. 199 "Universal" indicator announced by the Lufkin Rule Co., Saginaw, Mich. One of the reading faces is on the front, or flat side, and the other is on the end or top, making this indicator readable in practically any position. It is claimed to be especially suitable for jig boring, milling and drill press work. Model 199 has zero at the extreme left and reads from left to right, while No. 199A has zero at the center and reads to the left and to the right.



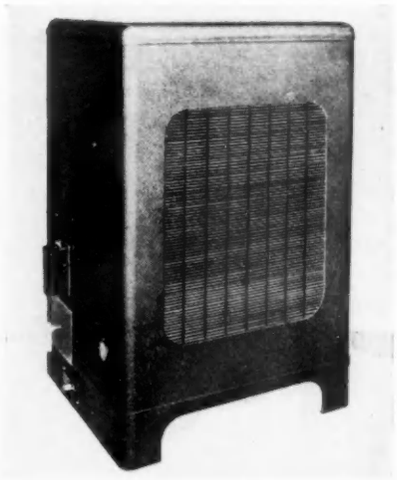
## Clark "Rees" Kickless Cable

The "Rees" kickless cable, offered by The Clark Controller Co., 1146 E. 152nd St., Cleveland, Ohio, is a water-cooled cable for connecting a portable welder gun with the secondary taps of a welding transformer. This cable consists of a central rubber core around which are helically wound flexible, tinned copper cables. For alternate polarity, these cables are separated by a corrugated live rubber spacer, and the entire unit is inclosed in a flexible, wire and woven fabric reinforced, rubber tube. This construction permits circulating cooling water in direct contact with the stranded copper cable, and provides the necessary flexibility.



## Trane Gas-Fired Unit Heaters

Available in suspended and floor-type models with capacities ranging from 45,000 to 85,000 Btu. input,



these gas unit heaters offered by The Trane Co., LaCrosse, Wis., have a fully automatic control. After the pilot has been lit, the thermostat automatically will turn on the heater when the room needs heat and turn it off when the proper temperature is reached.

## Reliance Reversing Planer Motor-Drive

An improved design of reversing motor-drive for planers, announced by The Reliance Electric & Engineering Co., 1042-1090 Ivanhoe Road, Cleveland, Ohio, makes use of armature speeds of 150-600 r.p.m. and 100-600 r.p.m. as against former standards of 250-1000 and 200-600 r.p.m. It is claimed that full horsepower capacity is maintained over the entire range. Improvements in the control equipment include a new pendant control station with extra buttons for added convenience in set-

ting-up the work. Master reversing switch mounted on the planer bed has been made direct-acting in order to speed up its operation.

## "Rezistor" Flexible Hacksaw Blade

Claimed to deliver maximum cutting service on any material at high speeds without danger of breakage, the flexible "Rezistor" hacksaw blades manufactured by the Henry G. Thompson & Son Co., New Haven, Conn., are available for hand frames or power saws. These blades are made from a special-alloy, high-speed steel and are given a heat-treatment which produces hard teeth with a soft-back blade. Blades for hand frames are available in lengths of 8, 10 and 12 in., and widths of $\frac{9}{16}$ and $\frac{5}{8}$ in. Power saw blades range in length from 12 to 24 in. and in width from 1 to 2 in.

## Oakite No. 1 Deodorant

Deodorant No. 1, developed by Oakite Products, Inc., 22 Thames St., New York, N. Y., is claimed to simultaneously clean and deodorize. It has the property of counteracting odors without creating another, that is, it does not replace one odor with another. It is said to be effective in those cases where odor formation is continuous.

## DuPont Type RC-900 Clear Finishes

Type RC-900 clear methacrylate-base finishes, announced by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., are claimed to afford unusual adhesion and flexibility over bare nonferrous metals such as aluminum, chromium and brass. Coating is hard and non-yellowing, resistant to acids, alkalies and alcohol. It may be applied by any of the usual methods, such as brush, spray or dip.

## Atkins "A-Mol" Hacksaw Blade

"A-Mol" molybdenum hacksaw blades, announced by E. C. Atkins & Co., 424 Illinois St., Indianapolis, Ind., are made in all standard sizes, lengths and widths for hand and power use. There are nine sizes of hand blades with 18, 24 or 32 teeth per inch and 32 different power blades with from 4 to 14 teeth per inch.

# TRADE PUBLICATIONS

**BENCH LATHES** Bulletin No. 608-C, issued by Rivett Lathe & Grinder Inc., 20 Riverview Rd., Boston, Mass., describes the No. 608 precision, back-geared screw-cutting lathe and illustrates available attachments.

**COMMUTATOR MAINTENANCE** Ideal Commutator Dresser Co., 1227 Park Ave., Sycamore, Ill., offers a six-page illustrated mailing folder describing products designed to keep commutator maintenance costs at a minimum.

**CUTTERS** H. K. Porter, Inc., Everett, Mass., has published a catalog dealing with hand-operated industrial cutters.

**FILES** Catalog No. 22 announced by Grobet File Corp. of America, 3 Park Place, New York, N. Y., lists 200 different kinds of hand, rasp and milled cut rotary files.

**FORMING MACHINES** A 32-page illustrated bulletin issued by Tishken Products, Detroit, Mich., discusses

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features of a line of roll-forming machines.

**GAGE BLOCKS** Circular No. 7010 describes an inspection service for gage blocks and accessories offered by Johansson Div., Ford Motor Co., 3674 Schaefer Rd., Dearborn, Mich.

**GRINDERS** Catalog No. C. G. 436, offered by Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit, Mich., includes complete specifications of a new bench-type grinder.

**GRINDERS** Rivett Lathe and Grinder Inc., 20 Riverview Rd., Boston, Mass., describes the No. 112 universal grinder in Bulletin No. 112B and the No. 104 precision internal grinder in Bulletin No. 104C.

**GRINDERS** The Abrasive Machine Tool Co. of East Providence, R. I., has published a 34-page catalog, in which are described a number of surface grinders.

**LABOR LAWS** The New York State Department of Labor has issued the 1938 edition of the New York State Labor Law with amendments to December 31, 1938. The new edition contains the full text of the State unemployment insurance law, together with pertinent information dealing with recently enacted state labor legislation.

**LATHE DRIVES** Data concerning bench lathe mounting and driving equipment are included in Bulletin No. 120-A issued by Rivett Lathe & Grinder Inc., 20 Riverview Rd., Boston, Mass.

**LUBRICATION** The selection, care and lubrication of rock drills is discussed in a booklet published by the Texas Co., 135 East 42nd St., New York, N. Y.

**NICKEL ALLOY STEELS** The International Nickel Co., Inc., 67 Wall St., New York, N. Y., has published a revision of data sheet Section III No. 1, entitled "Properties and Uses of Some Cast Nickel Alloy Steels."

**PANEL INSTRUMENTS** Catalog Section 43-470, issued by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., gives data on 4-in. miniature panel instruments for a.c., d.c. and radio-frequency applications.

**PLATING** Heil & Co., 3088 West 106 St., Cleveland, Ohio, has issued several leaflets dealing with equipment for metal, finishing.

**SMALL TOOLS** Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., announce publication of No. 15 small tools catalog. This 460-page cloth-bound book lists taps, dies, cutters, reamers, punches, drills and similar tools.

**STAINLESS STEEL** Joseph T. Ryerson & Son, Inc., 16th and Rockwell St., Chicago, Ill., has announced publication of "Allegheny Stainless Steels," a booklet illustrating the possibilities of stainless steels for industrial applications.

**STEEL STAMPS** Bulletin No. 113-1describes a line of steel stamps made by New Method Steel Stamps, Inc., 149 Jos. Campau Ave., Detroit, Mich.

**THREAD GRINDERS** Jones & Lamson Machine Co., Springfield, Vt., offers an illustrated catalog discussing the features of automatic thread grinding machines.

**THREADING TOOLS** An improved thread tool is described in Bulletin 110-A, issued by the Rivett Lathe and Grinder Inc., 20 Riverview Rd., Boston, Mass.

**TRANSFORMERS** The Eisler Engineering Co., 745 S. 13 St., Newark, N. J., describes a complete line of distribution, spot-welding and other types of industrial transformers in Catalog No. 38-T.

**TURRET LATHE** An eight-page bulletin offered by the International


ANOTHER WAY

**Your larger jobs,**

**like the one shown here, might at first glance seem to require a fairly large radial drill, but a careful study of the features and productive capacity of the new High Speed SUPER SERVICE Radial may help you to visualize a set-up like this—less costly, more efficient.**

**You can save first cost, direct labor, floor space, interest and depreciation charges, and get more work per dollar with this new radial. It's proved by the experience in our own plant and in more than 300 others. May we send you complete details? Write for Bulletin R-21A.**

**The Cincinnati Bickford Tool Co.**
**Oakley, Cincinnati, Ohio**

SUPER SERVICE

CINCINNATI BICKFORD

Machine Tool Co., Indianapolis, Ind., discusses the features of the Libby "Uni-Flex" universal general-purpose turret lathe, which is available in five sizes, with swing over ways ranging from 24 to 36-in. diameter. A number of attachments are shown.

**WAGE-HOUR LAW** "Coming Problems Created by the Fair Labor Standards Act of 1938" is the title of No. 28 in a series of booklet-editorials by Allen W. Rucker in collaboration with N. W. Pickering, president, Farrel-Birmingham Co., Inc. This booklet outlines the probable effect upon labor, employment and purchasing power of the Act, and discusses the "economic drift" of the national wage fund and its probable consequences. Copies can be secured from the Farrel-Birmingham Co. Inc., Ansonia, Conn.

**WHEELBARROWS** Catalog 54-32, published by the Fairbanks Co., 393 Lafayette St., New York, N. Y., describes a complete line of wheelbarrows.

## TO THE EDITOR

Dear Sir:

The business men of the country, most of the economists and many of the editors are so busy finding fault with the Administration and blaming the New Deal for unemployment and all other evils that a defeatist frame of mind has been pretty well established with the result that business in general has fallen to a very low level from which no effort is made to raise it. Plans made in Washington are condemned as failures before they have even been tried, and the whole atmosphere is loaded with gloom and pessimism. However there are a few bright spots, and *Factory* recently published a list of 230 industrial companies which reported profits for the first quarter of 1938, and the list is far from complete as it does not include numerous small companies which do not publish financial reports. It is a pretty safe conclusion that the executives of these companies are not spending their time squawking about the New Deal, but are facing their problems with courage and a fighting spirit.

How some of the companies in the list succeeded in making profits is known and may be worth considering. Early in the year one of these companies sent a letter to each of its stockholders stating bluntly that prospects for sales were far from bright and that in order to show a profit unusual efforts must be made; therefore the advertising appropriation had been increased 50 per cent, additional salesmen had been employed, and the executives were going out on the road to see what could be accomplished. That company is having a good year.

Another company in the list found that most of the concerns in its line were closing down and had about decided to do likewise when a director said, "If so many of our competitors are not producing, there must be plenty of business for us. All we have to do is go get it." The product was improved and a fight put up for orders with the result that the company appears in the select list of those showing an increase in profits over the first quarter of 1937.

Other concerns might be cited, but the stories would be similar as in each case two characteristics stand out; courage and a willingness to fight no matter how great the handicap. If more concerns would forget the New Deal and put some energy in their own business, conditions would soon be better. This country was built on a foundation of courage and in order


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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES
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to prosper we must eliminate fear and substitute courage. —C. J. MORRISON, CONSULTING ENGINEER, *Meyer, Morrison & Co., Inc.*

Dear Sir:

May I enter a protest against the wholesale criticism of the younger employees such as that under the title "Dad Says" (*AM*—Vol 82, page 413)?

It is true that they lack experience, a much-needed quality, but when the other faults develop which Dad mentions we should look for the cause in bad management, or a misunderstanding of youth on the part of the management. A reasonable attitude on the question is needed before a fair solution can be reached.

"When business started to pick up they began hiring in some of these youngsters." That is just what I did, for there seemed to be an inexhaustible supply when experienced competent men simply could not be found. But the results were not what Dad found. No one asked for an unreasonable wage, or made any other unreasonable request. And when the current business reaction made curtailment essential, they saw the necessity just as well as the management. When the unavoidable cuts were mentioned, no expression of either surpise or of complaint was heard. Instead there were several expressions of appreciation for not having made them sooner.

May I also mention another thing that I have found to the advantage of youth. Without examining records, I should estimate that the boys hired when less than 16 have stayed with us at least twice as long as those hired between the ages of 16 and 21. This last group have, in turn, stayed at least twice as long as those hired as adults. Granting that they all lack experience at the start, the employee with five years experience in our plant is worth more to us than one with ten years in several plants. The reduction in labor turnover resulting from hiring the younger boys is of value in itself. —A. W. FORBES *Forbes & Myers*

**YOU'LL KNOW YOUR DIE MAKER WAS ON THE JOB**

**Back of every thoroughbred that wins the race, is a trainer, who fitted him for it. Back of every die is a die designer, a die maker, a tool room, a tool and die shop that builds that die for production work.**

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**DANLY PRECISION DIE SETS**


## 60 YEARS AGO

The following items appeared in *American Machinist* for September, 1878:

### *Reviews*

Electric Lighting—A practical treatise by Hyppolyte Fontaine; 194 pages, octavo; (Translated from the French). E. and F. N. Spon, London, and 446 Broome St., N. Y.

The above is the title of a new work just come to our table, treating upon a subject that has recently attracted a great deal of notice. To quote from the preface, "Few questions have, at the present time, the advantage of exciting public attention to the extent of this one". Experiments have been made in nearly every civilized country on vessels, quays and dockyards, in workshops, harbors, fortifications, railway stations and other situations, to determine the practical value of electric lighting. While many persons have exalted it as being vastly more economical than gas, and almost as intense as sunlight, more, by far, have looked upon it with a kind of old fogey aversion, choosing to treat it rather as an ephemeral fancy like the blue glass craze.

An Ohio genius recently exhibited at Columbia, Pa., an iron man who walks by steam. The iron man walks on a circle of boards about seven foot in diameter, and is moved by two little engines in his chest to

which steam is communicated from a boiler by pipes through his hands and arms. In his mouth is a thin tube through which the exhaust steam escapes.

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## Al Is Gone

Al Hacker is gone. A humble man, but one of the few real present-day mechanics. He knew his trade, and he taught it. He had no time for pretense and no patience with ineptness or carelessness.

I remember as if it were yesterday the day he "took me in hand." I was the newest, rawest, dumbest of apprentices. I suppose now they'd call him "assistant foreman" or "assistant supervisor," but in our plant he was just next in line to the foreman. It was Al who took over the "tricky" jobs and licked them, who didn't think of grease, grime or time, but only of a machine that needed fixing. I remember lying under a locomotive crane replacing the travel gears through a Saturday night, a Sunday and a Sunday night, with the thermometer at zero and below, and a labor gang working at a windbreak and firing the salamanders to try to cut the icy wind. The crane had to be ready for Monday morning. Al got it done.

Al is gone and with him died a generation of craftsmen who did their work well because they loved it, not for pay. If you'd asked him if he loved his work, he'd have socked you, but he loved it just the same.

I was the "Boss' kid" and he could have curried favor by sparing me. But not Al. He literally rubbed my nose in the dirt. At noon of my first day he looked at my clean hands and overalls with disdain (I'd been brushing off hose nipples in the tool crib) —and sent me out with a pail of kerosene, a stencil brush and a couple of broken sawblades to clean up a vertical bulldozer covered with a seven-year accumulation of fuel oil and scale. My job it was, too, to pull off the head of the air-tool greasing cylinder every time the piston stuck, bare an arm, and feel around in the grease to find out what was causing the trouble. I finally got mad enough to take it apart and fix it. Al just grinned.

He made his men unafraid of dirt, but at the same time he didn't compromise with it. To him a dirty apron or suit of overalls was the mark of a sloppy mechanic. He taught me to get my hands dirty and clean again without wiping them on my overalls —a little thing, but the first of many steps toward neatness and accuracy.

He taught me patience, and care, and responsibility. He taught me to pull my foot out when a die dropped, but to push it under when my "mikes" fell. He taught me to grind a drill so that both lips cut, when to use cutting compound and when to use kerosene, when to set up a lathe with carpenter's chalk and when to use a dial gage, when to work to close tolerances and when to forget them. He trained me in principles, then let me "sink my teeth" into a job on my own, making my own mistakes, and learning to correct them as I went.

He didn't believe in loafing, even when there was nothing "official" to do. There were always machines to be torn down and repaired, or boring bars to be forged, or tools and jigs to be made. "Spare time" he sent me out with the millwright, the pipefitters or the electrician, or to operate a punch press with a die in it that I'd made; to make some of my own tools to "see how long it takes, so you'll know how much they're worth"; to the vacant section of the storeroom with a pail of rivets and a pair of pick up tongs, to pitch rivets into specified bins from steadily increasing distances. Or to practice

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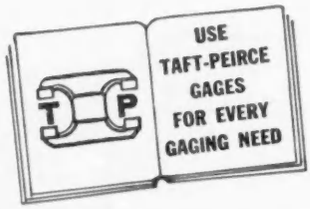
"shinnying" up a column in the erection shop. Some of these things weren't part of the job, but Al said "they'd come in handy some day." They did and they do.

He taught me sportsmanship, too. One noon hour while we were boxing, he got me into a corner. I got mad, so he dropped his gloves and refused to go on. Another time I caught him between the eyes with a snowball when he had both arms loaded. He looked at me and turned his back on me. He forgot it later, but I never have.

Maybe all these things weren't necessary. Perhaps it is enough for a man to learn to operate one machine, or a dozen. But that wasn't Al's definition of a machinist. He never called himself anything but just that, but to him it meant mechanic, machine operator, bench hand, diemaker, toolmaker and all-around skill rolled into one. He never stopped learning. To him the machinist was the king of craftsmen.

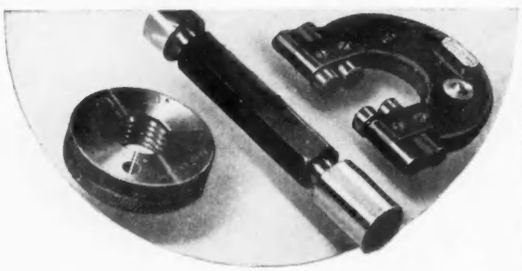
Yes, Al is gone. But as far as one man can do so, he maintained a tradition—even in his dying. For he died in the full flush of manhood at 50, on the first vacation he ever took.


SHORT STORY

*of a World-known Trademark*

One of the first landmarks in size-control of production was the Taft-Peirce house emblem —a snap gage. And over the years, many valuable ideas and gage patents developed under this mark have been contributed freely to industry as American Gage Design Standards. Now, as then, this mark certifies that every Taft-Peirce gage can be relied upon to measure accurately the maximum amount of work per dollar of its cost. Check your needs against the adjoining list . . . or write for prices on any special requirements.



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Plug, Cylindrical, Reversible
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Plug, Cylindrical, Taper Lock
Plug, Cylindrical, Taper Lock, Extra Long
Plug, Cylindrical, Taper Lock, Progressive
Ring Gages, External

**Thread Gages:**

Adjustable Snap
API Plug & Ring
Basic Size Plug & Ring
Blocks, Threaded Setting
Foreign Standards (British, Whitworth, International, Lowenherz)
Limit Plug, Reversible & Taper Lock
Limit Ring (and setting plugs)
Pipe Thread, Straight & Taper
Ring
Setting Plug
Spark Plug
V-Thread

**Snap Gages:**

Adjustable Thread
Midget
Plain Adjustable, Round Buttons
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**Special Gages:**

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Discs, Master
Flush Pin Gages
Gage Blocks
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*Check your requirements on this list, and mail it in for information and prices.*

THE TAFT-PEIRCE MFG. CO.

*WOONSOCKET RHODE ISLAND*


## Young Tom's New Ratio—50 to 1

JOHN R. GODFREY

Years ago the country was all stirred up over the proposed 16 to 1 ratio. Young Tom isn't old enough to remember about that. Now Tom is a bit stirred up and he has a ratio all his own—not about gold and silver, but small pay in the shop and big salaries for the brass hats. Of course there is nothing new about that—but it has hit Tom hard since he's been on this washing machine job.

"It's this way, Uncle John. I know we need management just as much as we need skilled men in the shop —perhaps more. But if we pass up either one we have no production and that's where all wealth comes from; so it isn't easy to say which is most necessary.

"You'd think to hear some of these managers talk that they always guessed right the first time. None of us are as good as they think they are—at least in public. I wonder if they ever let their hair down and own up to each other what bulls they've made.

"We've heard a lot about minimum wages, Uncle John, and we all have 'em whether it's regulated by law or not. Now it's my notion that we need a maximum salary just as much. Not in dollars perhaps but as a ratio between the lowest salary on the pay roll and that of the G.M. in the inner sanctum.

"I'd be liberal too, Uncle John. I'm no piker, I'd make it 50 to 1. If the lowest paid man on the list gets $1000 a year, the grand mogul can't draw over $50,000—and that's a lot of dollars in any man's money. If the lowest paid regular employee only works enough to earn $500 a year, the head man would have to struggle along with $25,000.

"Of course the grand guy will say he can't help business recessions—but neither can the helper in the shop. And the G.M. is supposed to have a lot more brains to justify his salary, even if he only draws 25 to 1. Furthermore, the helper can't be left to starve, even when he's laid off. So someone who has it must come across, and the G.M. isn't exempt."

I'm not dead sure as to just how serious Tom is about this 50 to 1 ratio. But it would help to smooth down some of the feathers that get ruffled when men see lists of salaries that figure up more per month than theirs do in ten to twenty years. It's probably natural for all of us to think we earn more than we get.